Products Finishing

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SEPTEMBER • • • 1948

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Products Finishing

Research--An Aid to Scientific Selection

Many organic coatings have failed to provide satisfactory protection against corrosion simply because all the factors which accelerate corrosion or which make it possible to coat a surface efficiently are not understood. Considering the manufacturers' investment in the actual cost of protective coating materials, together with the fact that the labor cost of application may be several times the raw material cost, it becomes evident that the proper selection of protective coatings assumes a role of great importance to the economy of many manufacturing plants.

It has taken years to demonstrate that service conditions are the primary factors in the corrosion of the commercial forms of iron and steel. With the development of corrosion study, both from the standpoint of theory and practice, it became evident that each specific corrosion problem was one of determining what factor in a given service was responsible for the corrosion and then either neutralizing that factor or finding a metal or alloy or coating that was resistant to that factor.

Within the past few years there has developed an increasing appreciation of the underlying mechanism by means of which the failure of an organic coating may occur. Reduced to its barest essentials, the function of any protective organic coating is to prevent corrosion of the base metal in the environment in which it is used. In most cases, however, a protective coating, in addition to providing protection against corrosion, must enhance appearance or perhaps fulfill some physical need such as abrasion resistance. When selected, it thus represents a compromise of these factors, as well as cost considerations. Processing limitations frequently determine the ultimate selection at some sacrifice in the desired qualities of the protective coating.

Considerable progress also has been made within the past few years in attempting to relate the composition of organic finishes to their final form. Each type of organic finish has certain properties that may recommend it for use in certain fields. The technicians of the protective coatings industry, after study of specific finishing problems, can often help decide, on a scientific basis, what finish is best for a specific application.

LUMINOUS Paint Compounds

By JOSEPH M. OXENHORN

PF FEATURE

THE application of luminous paints to various surfaces has interested manufacturers in many industries. The results produced by such paints and the possibilities for increased merchandising applications are numerous.

Luminescent, or luminous paints, are those which by their chemical action are able to emit light which is visible to the human eye. Such finishes have found use in the manufacture of dials, indicators, pointers, signs, advertising display signs, theatrical appliances, warning devices, safety devices, and many other products where visibility in the dark is required.

In 1601, Vincenzo Cascariolo, a cobbler in Bologna, spent his spare time trying to ferret out the secrets of making gold, like other alchemists of his day. One day he found a stone which seemed to be quite different from others he had seen. Upon experimenting with it, he found to his amazement that it glowed with a brilliant light after heating it. The stone was later found to be the mineral barium sulphate. From the days of Cascariolo and his "Bologna Stone," the work on luminous compounds has taken great strides. What was only a field of novelty a few years ago is today an important field in product finishing, and the many applications of luminous paint have been recognized after its remarkable service in the war effort.

Referring to Fig. 1, luminous paints are of three general types; namely, radioactive, phosphorescent, and fluorescent. Radioactive luminous paints make use of radium and only recently manufacturers have begun to use the new element polonium. Radium possesses the property of radioactivity; that is, the emission of rays. Its deterioriation and emission of rays were quickly observed, and its use on the dials of clocks is familiar to all.

When minute quantities of radium are combined with certain other pigments, the resulting compounds will produce a glow in darkness. This glow will continue for many years without any renewal or reactivation. The more radium that is used, the greater will be the intensity of the glow. Such radium compounds are available to produce varying degrees of luminosity, from a highly visible glow down to a dim glow of great constancy. No connection with wires, switches, lamps or

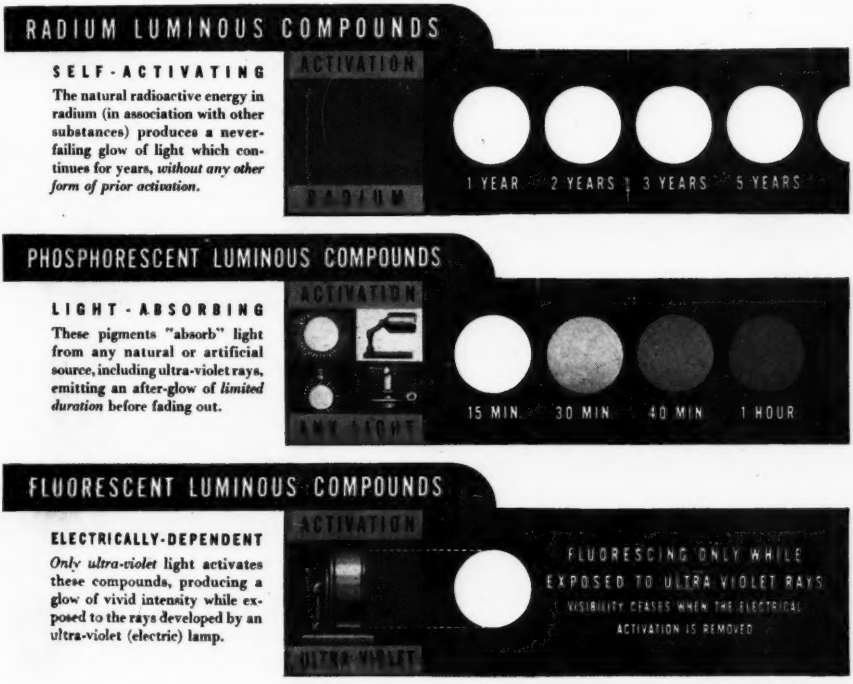
batteries is required; there is no danger from sparks or short circuits. No extra weight is added to the finished surface, and hence this factor does not enter into engineering calculations.

More recently, the element polonium, a discovery of Madame Curie, has been used in luminous paints. While radium emits alpha, beta, and gamma rays, polonium emits only alpha rays. It can therefore be used safely in photographic darkrooms or wherever films are handled.

Phosphorescent luminous compounds contain pigments which cause an after glow for some time after they have been illuminated by **any** light of short wave length, such as sunlight, tungsten, carbon or mercury arc. The glow lasts for a period varying with the compound and with the intensity of the illuminating source.

Fluorescent luminous compounds are those which are made to glow in complete darkness provided they are exposed to ultra-violet light (black light, invisible to the human eye). As long as the U-V light is projected upon surfaces finished with such compounds, they continue to glow. When the light source is removed, the light disappears. Like the phosphorescent materials, the amount of luminosity depends upon the amount of the compound, the intensity of the light, and the surface illuminated. Special ultra-violet lamps are available for such purposes, as shown in Fig. 2.

Fig. 1—Graph showing results obtained when radium, phosphorescent, and fluorescent luminous compounds are activated
(Illustration courtesy Radium & Uranium Corporation)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SELF-ACTIVATING
The natural radioactive energy in radium (in association with other substances) produces a never-failing glow of light which continues for years, *without any other form of prior activation.*
ACTIVATION
RADIUM
1 YEAR
2 YEARS
3 YEARS
5 YEARS
PHOSPHORESCENT LUMINOUS COMPOUNDS
LIGHT-ABSORBING
These pigments "absorb" light from any natural or artificial source, including ultra-violet rays, emitting an after-glow of *limited duration* before fading out.
ACTIVATION
ANY LIGHT
15 MIN.
30 MIN.
40 MIN.
1 HOUR
FLUORESCENT LUMINOUS COMPOUNDS
ELECTRICALLY-DEPENDENT
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ACTIVATION
ULTRA VIOLET
FLUORESCING ONLY WHILE EXPOSED TO ULTRA VIOLET RAYS
VISIBILITY CEASES WHEN THE ELECTRICAL ACTIVATION IS REMOVED

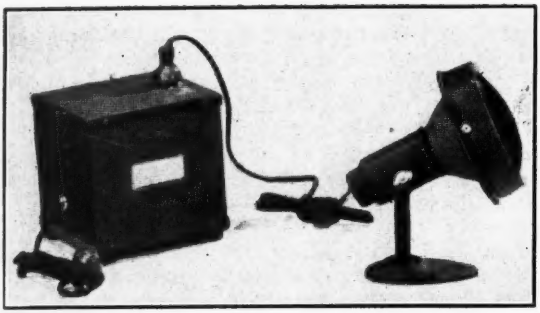

Fig. 2—Special ultra-violet lamp for illuminating surfaces finished with fluorescent luminous compounds
(Photo courtesy Strobolite Company)

Many natural materials possess luminescent properties, and the list of organic materials which emit light is practically endless. For example, the organic dyes rhodamine and eosin are highly brilliant when dissolved in a lacquer or vehicle. The disadvantage to their use is that they are not sunfast, and thus are not highly practical. Among the natural materials which have been proved useful in the dye field are fluorite (calcium fluoride), calcite (the mineral form of calcium carbonate), and willemite (zinc orthosilicate).

In the field of paints, the most generally used pigments are the crystalline forms of (1) zinc sulfide, (2) cadmium sulfide, (3) calcium sulfide, and (4) strontium sulfide. Very often combinations of (1) and (2) or (3) and (4) are used. The pigments are quite coarse as regards particle size, ranging from 5 to 20 microns, as compared with ordinary paint pigments which are 10 to 100 times smaller. Thus, a smooth finish cannot be expected.

Phosphorescent pigments are yellowish white or gray white in daylight. In the dark, they run from deep purple to green, yellow, and orange. The colors generally produced by the various pigments are as follows:

strontium sulfide ____greenish blue
calcium sulfide _____violet
barium sulfide _____yellow orange
zinc sulfide _____yellow green

Some manufacturers supply the pigments suspended in the vehicle. Others supply the pigments and vehicle separately, since they feel that different surfaces require different vehicles and different applications.

Application of Phosphorescent and Fluorescent Paints

The surface to which phosphorescent or fluorescent paint is to be applied should be dry, neutral, and free from all surface impurities. The application should always be made to a white or light colored surface. Use only zinc white as a light base when necessary. Do not use lead base materials.

Fluorescent and phosphorescent paints may be screened, sprayed, or hand applied. When sprayed, the usual thinning precautions should be taken, using the thinner supplied by the manufacturers. For hand application, use a fine sable-hair brush and dip lightly. To obtain the best results, cover only the tip of the brush and use long strokes, avoiding "jerky" motions.

The painted objects should be allowed to air dry for two (2) hours. If possible, this air drying should be followed by oven drying for one or two hours. This operation is best carried out at a temperature of 125 deg. F. Otherwise, air dry for 6 to 10 hours. A final spray with a good clear lacquer will serve as a protective coat. **Precautions:** Wipe brushes with fine tissue; clean with suitable thinner. Keep the paint jars tightly covered to prevent evaporation of the solvent. Wash hands thoroughly after painting and inspect under any ultra-violet lamp.

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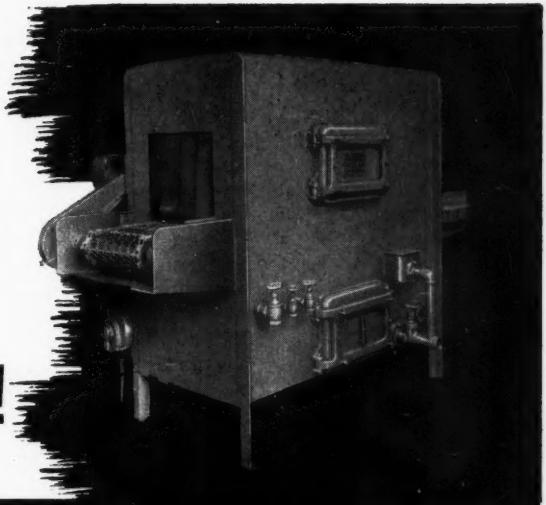

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Application of Radioactive Paints

Radium and polonium paints require special handling. **Never spray such paints!** To obtain best results, only very small mixtures should be made (in some cases, as little as one grain). This is particularly true in the case of the higher grades of radioactive materials. Mixing should always be done by the same person, wearing a respirator, who will then learn how to mix properly. Never chew or smoke during mixing or painting.

It is desirable to have a darkroom where the work may be examined under U-V light. This room can also be used to examine the hands and clothes of the personnel handling the paint mixture. Waste materials should not be thrown out. Rather, they should be collected until a considerable quantity is on hand and then turned back to the manufacturer or refinery.

Mention has already been made of some of the uses of luminous paints. Many new uses have been created by the impetus of the war. Air raid wardens, military personnel, and civilian defense workers first had contact with such paints in use on their clothes accessories such as belts, buckles, badges, and buttons. In other fields, illumination was impossible and we turned to luminous paints. The uses for such materials have by no means been exhausted, and enterprising manufacturers should find profitable possibilities in these products.

LITERATURE

1. Handbook H 27, Bureau of Standards. For sale by U. S. Gov. Printing Office. 10 cents.
2. Circular Letter No. 550, Bureau of Standards, Dept. of Commerce. Free.

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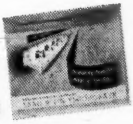

General Chemical Technical Information Manual LTF-1 contains extensive data on plating lead-tin alloys. Full details on bath make-up and operation, bath control analytical methods, analysis of deposits, etc. For your free copy, write General Chemical Fluorine Division, 40 Rector Street, New York 6, N. Y or nearest office below

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Plan for plating room *Process Control*

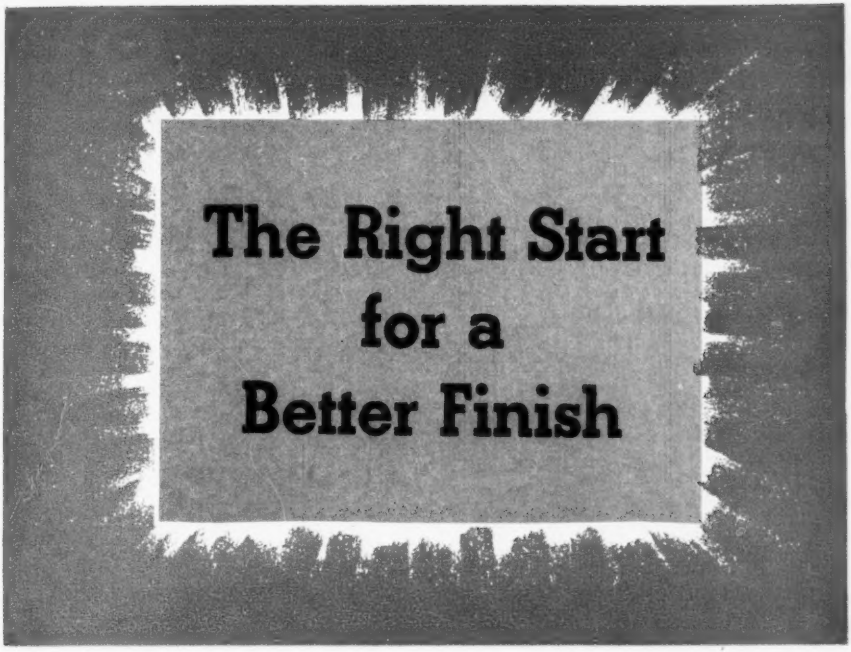
By GEORGE BLACK

THE old adage, "An apple a day keeps the doctor away," was never meant to be taken literally. It was just another way of saying that an ounce of prevention is worth a pound of cure, a stitch in time saves nine, and a dozen similar bits of wisdom. Nowhere is the truth of these maxims more apparent than in the industrial world. In the plating room, where so many intangibles are at work all the time and where unseen reactions go on and on until they are revealed by work of poor quality, the value of prevention assumes even greater proportions.

A good doctor will tell you to bring Johnny in for a regular check even if he looks the picture of health and has never had a sick day in his life. For years, the medical profession has been preaching the value of recognizing symptoms so that the disease could be caught in the early stages and destroyed before it got a good grip. What goes for individuals goes for groups; and whether it's men or machines or solutions the situation is unchanged. If you can find the trouble when it's just getting started, you can root it out quickly and effectively.

But ask any consultant just how far the "apple a day" policy is carried out in the various plating shops he visits. He'll tell you that without doubt, the great majority of plating shops, large and small, are willing to spend almost any amount to overcome a particular production bottleneck, but when it comes to scientific control on a pre-trouble basis, they are short on dollars. Now that Mr. John Q. Public is beginning to demand the quality he has a right to expect, there is a renewed interest in continued production. . . a new emphasis on preventing a costly tie-up due to the production of rejected work. It's a healthy sign for industry to hear shop foremen talking about overall planning of the department and to find a friendly handshake and a smile when you walk into a plating shop, large or small, to talk over methods for safeguarding quality and simplifying diagnosis of troubles which may occur. The purpose of this article is to outline a typical working procedure which costs practically nothing to establish and which will repay with greater work uniformity, productivity, and quality those with the patience and the foresight to see its value.

No procedure, no matter how perfect, can be expected to function to advantage if the men trusted with the responsibility of carrying it out are not concerned or are not reliable. We would list as point number one in the inception of a working program, the choice of the right man. Find the man



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Not long ago, we chanced upon an interesting case where, in one of the largest plating rooms of the district—an organization fully equipped for chromium, nickel, copper, silver, cadmium, and zinc plating; for phosphatizing, anodizing, pickling, and a number of other surface treatments—the man chosen to carry out "solution control" was a person whose educational and industrial background made it impossible for him to even understand what he was doing. He carried on his "duties" from day to day, dumping enough of this and that, every time something went wrong. When things didn't work out just right, he would ask the foreman what to do and, on the basis of sound experience, the foreman was usually able to help out.

During one of the many bottlenecks, we suggested that a certain Mr._____ be taken away from the plating tanks and put in charge of solution control. The answer was in the negative. Mr. _____ was too good a plater, too reliable a person to take off the production line. What logic! No matter how many good platers you may have, when chemical composition of the solution is not correct, the quality of the work will be inferior, and no deft operator can do a thing about it! Perhaps it will mean paying a slightly higher salary to the man singled out to control solutions, but it will be worth every cent of it.

Point number two to be considered is the education of personnel. The days of "keep them dumb or they'll get your job" are gone. If you keep them dumb today, they may not get your

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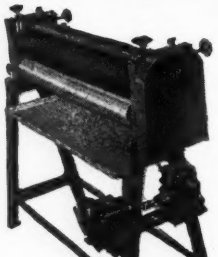

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job but someone else will. Whether you like it or not, your success as a plating room executive depends on how well your men know their jobs. The more a man understands about his job, the more he will like it, the more interest he will show, and the better job he will do.

There are many ways to carry out this educational program. Let's look at a few of the most common. One of the best is just plain gab—with a purpose. Through the medium of personal contact and informal discussions on an individual or group basis, it is possible to get the worker to see the importance of his job, to feel more important himself. This serves to lift his morale, to put him in a better psychological frame of mind so that he will be more interested in what he is doing, more alert and conscientious.

You can help this situation along by seeing to it that there is plenty of literature lying around where the men congregate. Pamphlets, magazines, books, advertising bulletins, and any other information which touches on the plating field should be easily accessible to the men. It will help them to realize that they are part of a great national industry. Encourage the men to talk shop, to compare what they are doing with what is being done in other places. Let the men feel that you value their opinion, give them a chance to get opinions, and you'll not have a five-o'clock-whistle-waiting crowd.

Another very good educational scheme is to label everything clearly. Don't be afraid of signs; people like to know what they are doing. Their lives have been a training in the observation of signs. Even in the neighborhood where you have lived a good portion of your life, you'll look up at the corner street signs or at the numbers on the houses. These signs give you a kind of security; they put your mind at ease even if you know them so well that they are never translated into conscious thought. And don't forget about the new men in the shop. Without these signs they feel lost; about the same way you would feel in a strange town which had no street names and no house numbers. You'll get better production all around if each tank is labeled clearly as to the solution it contains and specific instructions or precautions which must be observed.

If you've done this much—chosen a competent, reliable person for the responsibility of solution control and started on an active plan to bring up the educational level of your group so that the men know what they are doing and are interested in it — you've gone a long way. At this point, if you sit down with an experienced methods man or a chap who has been around in the industry, you can set up a program to control your own activities.

Since the controls which must be

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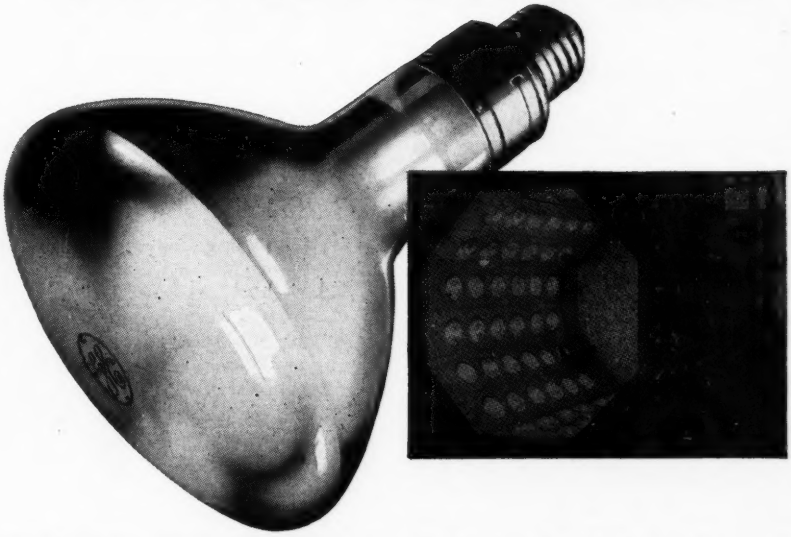

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G-E LAMPS

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PROCESS	SOLUTION	ITEM	STANDARD	FREQUENCY

Fig. 1—Master process control sheet

kept will differ with the various processes, anything we list here must, of necessity, be general in nature. However, the outline which follows encompasses a basic program of control which, if modified for your own plant, will most definitely pay off in continued quality production.

PLATING ROOM PROCESS CONTROL PLAN

1. **Master Process Control Sheet (Fig. 1).** This sheet should contain a complete listing of every process. Subheaded under each process should be a complete listing of every solution used. For each solution there should be a list of items which must be checked, together with a listing of the frequency of the check and the standard value sought. This check sheet belongs on the foreman's desk and is to be used as double check on the activity of the solution control man.
2. **Solution Control Sheet (Fig. 2).** For each solution used there should be a separate control sheet, preferably attached to the tank itself. This sheet should contain the list of items to be checked, the frequency of the check, and the permissible variation range. Below this factual listing should be sufficient space to allow listing of dates, findings, and action taken. In time of difficulty, these lists result in a great time saving, with a substantial corresponding saving in money.
3. **Material Record Cards (Fig. 3).** For each material used in making up or maintaining the various solutions there should be kept on file a separate record card listing the name of the material, the date, the

Fig. 2—Solution control sheet

SOLUTION	ITEM	STANDARD	RANGE	FREQUENCY

DATE	RESULTS	ACTION TAKEN, OBSERVATION AND REMARKS

WANTED: A quick-drying, oil-resistant finish to apply to bearing housing castings before machining.

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Advance PAINT COMPANY

Indianapolis Indiana

MANUFACTURERS OF INDUSTRIAL FINISHES

MATERIAL: _____

DATE	AMOUNT USED	PURPOSE (SPECIFIC)	DATE	AMOUNT USED	PURPOSE (SPECIFIC)

Fig. 3—Material record card

amount used, and the purpose for which it was used. Tabulation should be made on a weekly and monthly basis so that the amount consumed can be readily checked. This simplifies purchasing and highlights irregularities.

These three records are the basis of uniform operation. The actual design of the record sheets and cards will depend upon individual preference and the nature of the process. The sketches shown are samples of forms which have been used successfully in the past and which may be easily modified to suit almost any shop control standard. Bear in mind that first you must choose the right man and then you must enlist the cooperation and interest of your workers through education. Only if you do this can you expect any system of methods control to work.

A method by which iron, steel and other metal surfaces are given a strongly adherent corrosion resistant plastic coating, made from cashew nut oil, is described in U. S. Patent 2,436,420, granted to E. T. Clayton. Such a cashew nut extract does not ordinarily bond to metal surfaces, but this difficulty is overcome by the use of a sublayer paint consisting of fairly coarse zinc flake in a vehicle made from an alkyd resin. This paint, which is made with an air-drying, oil-modified alkyd as the main ingredient together with about ten pounds per gallon of zinc pigment, is applied to the bare metal in two or three coats, with intermittent drying between coats. On this is applied a resinifying mixture of cashew nut oil and paraformaldehyde. This polymerizes at atmospheric conditions to form an integral corrosion resistant layer bonded to the metal through the intermediate bonding layers.

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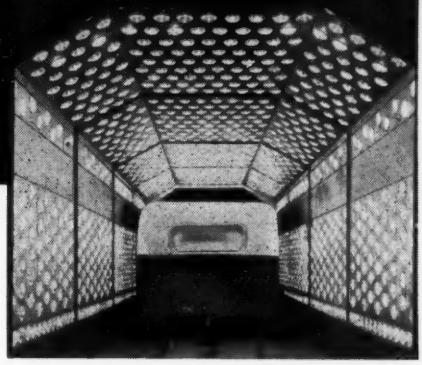

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DIE CASTINGS *Must be clea*

III.

A Compendium of Cleaning Cycles Proved in Present-Day Production Practice

By ARTHUR P. SCHULZE

TO obtain the absolutely clean surfaces so essential to many subsequent coating processes or treatments commonly employed in finishing die castings today, an acid treatment of one type or another must be used to meet certain special conditions that are encountered, depending upon the individual work in process, the coating or chemical treatment scheduled for subsequent application, and certain other factors. Often, the problem involves the removal of surface contaminants which are non-reactive to either solvent degreasing or alkaline cleaning. Or, in other cases, it concerns residual reaction products resulting from previous cleaning practices. Still again, surface-etching may comprise a necessary prerequisite to the application of chemical or electrolytic coatings.

In the fabrication of magnesium die castings, for example, work frequently acquires various water-soluble or non-emulsifiable substances ranging widely in character and extent. Oxide and scale films, some chemical coatings, and graphite-base lubricants are the principal examples of surface contaminates within this category that can be effectively removed with the proper type acid treatment.[1,2]

With zinc die castings, however, these particular deposits consist chiefly of oxides or scales. In addition, a thin film of alkaline salts may be left on the surface by alkaline cleaners, if rinsing is not carried out in a very thorough manner. Even then, instances have been known where this film still remains. Moreover, if cleaned work is exposed to the atmosphere for several days prior to electroplating, lacquering or enameling, it gradually accumulates a thin film of zinc oxide which, if not removed, proves detrimental to coating adhesion. Acid-dipping is utilized to solve such special contaminant-removal problems as these before finishing zinc.

In the process-finishing of aluminum, too, the answer to various surface-preparation problems, plant experience pointedly indicates, often lies in the application of suitable acid solutions, used either as a single treatment or in a combination cycle with alkaline cleaning. Such is the case, for instance, when it comes to the removal of the

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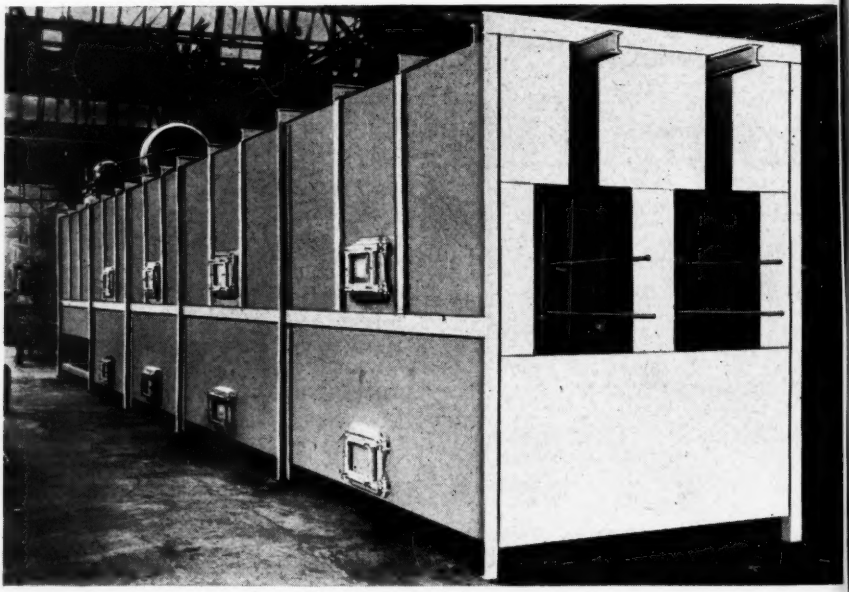
dark, loosely adherent film often left by either caustic dip or alkaline immersion etching treatment techniques employed in preparing work for chemical or electrolytic finishes. Other common examples are the removal of the oxide coating on heat-treated aluminum alloys and preparation of products or parts for plating or painting.[4,5]

Production requirements for acid-dipping or acid-cleaning of die cast work vary over a considerable range since they depend so much upon certain variables, including type of die cast pieces in process, operating conditions required, the individual job to be done, and so on. Techniques applicable to magnesium, zinc and aluminum die castings are available in limited number, and those methods and materials in widest usage are summarized in the following discussion.

Magnesium

In the surface preparation of magnesium prior to the actual application of protective processes or decorative treatments, acid-pickling is the final step after cleaning in a suitable alkaline cleaner.[6] The removal of oxide films, chemical coatings, certain types of fabricating lubricants and other water-insoluble or non-emulsifiable substances not reactive to solvent degreasing or alkaline cleaning is efficiently accomplished by the use of certain acid baths.[7] Several acids dissolve the oxide layer, but many of these are not suitable in action; immediately upon dissolution of the oxide film, the

Fig. 1—Five processing operations are performed by the machine illustrated herewith on a continuous, automatic cycle. They are: two thoro-wash and phosphatizing treatments, a clear water rinse, a mild chromic acid rinse, and a final drying operation. The machine's built-in-trolley-type twin conveyors are connected to the main conveyor system, thus making the machine a unit in a completely coordinated production system.
(Photo courtesy The Alvey-Ferguson Co., Cincinnati 9, Ohio)



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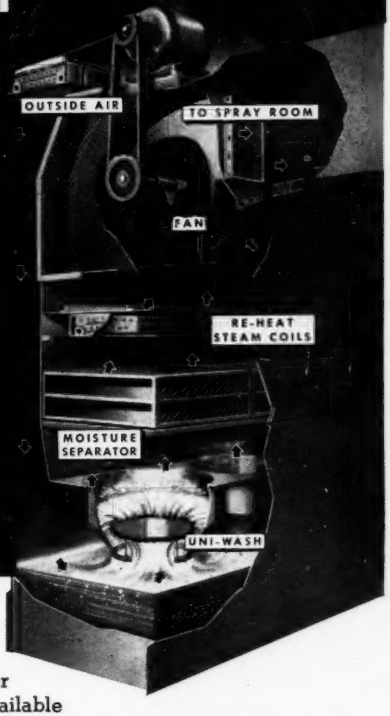

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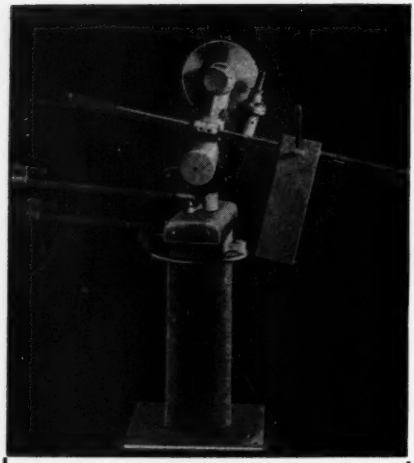

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attack continues unabated into the basis metal.[6]

The cleaning of work in a chromic acid solution affords an efficient method of removing these contaminants since this particular acid does not attack the magnesium, but readily dissolves the oxide and hydroxide which are ever present, even though very thin, on the surface of this metal.[1] In the case of die lubricants and other foreign substances the chromic acid dissolves the thin interfacial layer and then loosens the deposit.[2]

Magnesium parts to be acid-cleaned are immersed for a period ranging from 1 to 15 minutes in a bath at 190-212 deg. F., made up of 24 oz./gal. chromic acid.[7,8] When using water solutions of chromates, the soluble chlorine content of the make-up water should be kept at a minimum of 350 p.p.m. or less. Water containing more than this amount should either be treated with approximately 0.1 per cent of silver nitrate in a water solution to precipitate excess chloride, or chlorine-free water should be obtained.[6] Tap water may be used in making up this solution, but its chloride and sulphate content must be low.[7] The presence of excessive amounts of chlorides or sulphates in the bath causes it to form a coating on the metal which not only reduces the cleaning action of the acid solution, but also is apt to interfere with the chemical treatment subsequently applied.[2]

During normal operation of the bath, control of the chromic acid may be effected by maintaining the pH in the range of 0.5 to 2. The use of chromic acid solution to remove flux and corrosion products will frequently build up chloride, causing the solution to coat rather than clean the work. As previously pointed out, excess chloride can be precipitated with 0.1 per cent silver nitrate solution. A lead-lined steel or 2S aluminum tank may be used for the chromic acid solution.

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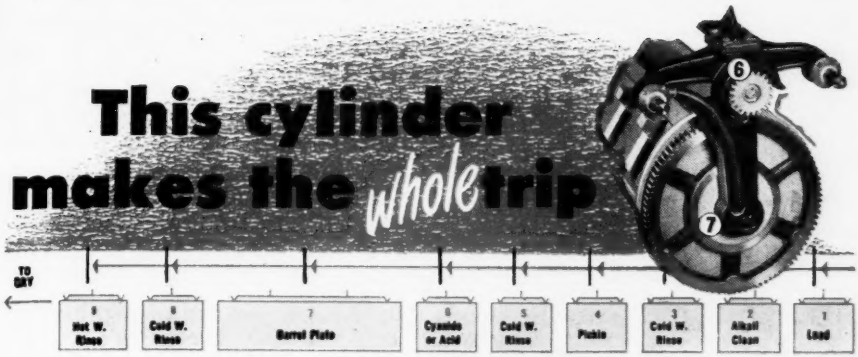

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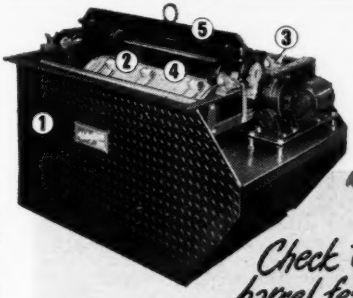

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Following the pickling treatment, parts are double-rinsed, first in cold water and then in hot water to eliminate interference with subsequent operations.[6]

For mechanically cleaned and unmachined parts, an acid dip is generally used, made up as follows:

Concentrated nitric acid
8% by volume
Concentrated sulphuric acid
2% by volume
Water ----------90% by volume

The work is immersed from 10 to 15 seconds in the solution which, used cold, removes 0.002 to 0.006 inch thickness of metal. The bath is considered as having become exhausted when its ability to remove obdurate scale within a reasonable period of time (30 seconds) is lost. It should then be replaced with a fresh solution. Cold and hot rinsing follow.

Several different chemical protective, decorative, or combined protective-decorative coatings have been devised in recent years. Many of these finishing treatments have only slight differences; many have not been used commercially.[7] Among those most commonly used are the chrome-pickle, acid-chromate, alkaline-dichromate, anodic, galvanic anodizing, and the sealed chrome pickle.[8]

Having been adequately discussed on previous occasions in PRODUCTS FINISHING, these treatments accordingly fall beyond the scope of the present discussions. The prime purpose in mentioning them here, however, is to emphasize the one important fact that in applying most chemical finishing treatments on magnesium, thorough cleaning is the first step in the processing cycle, followed by a suitable acid-pickling procedure as may be required. However, where parts are chrome-pickled prior to anodic treatment, pickling is usually unnecessary. Neither is it required if the coating is

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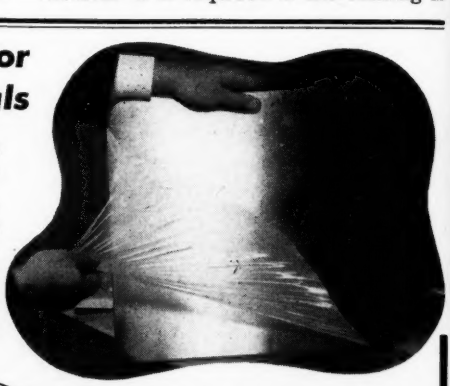

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to be painted, unless the surface has been previously wire brushed or blasted. In most other instances, parts are subjected to pickling, the solution employed depending upon whether or not close tolerance is required.[1] To improve the corrosion resistance of chrome-pickled magnesium die castings a 30-minute immersion of the work at room temperature (70-90 deg. F.) in a solution of 1-2 pounds of potassium or ammonium dichromate per gallon of water is frequently used.[6]

Zinc

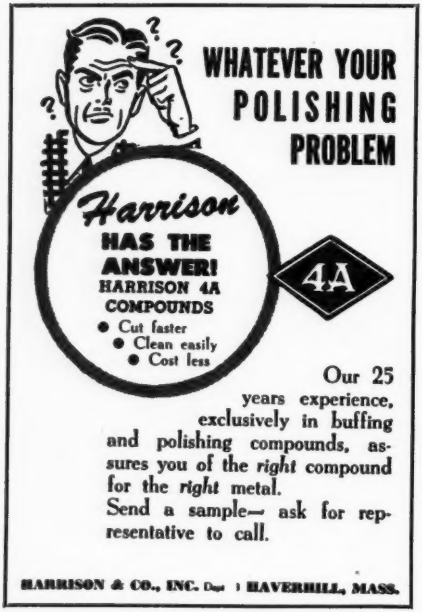
It already has been stressed that in the electroplating or organic finishing of zinc alloy die castings, maximum adhesion of coating applied demands maximum surface cleanliness, this usually requiring, in turn, a suitable acid dip to eliminate the thin film of alkaline salts left on the surface of the work by the alkaline cleaning bath and not removed by rinsing.[3] In the application of blackening processes, too, absolute surface cleanliness is a prime requisite, with the result that a deoxidizing dip is generally necessary to obtain the surface condition required for a sharp black finish.[9] Where bright finishes are called for, acid dips are employed.[6] [8]

The acid-dipping of zinc alloy die castings is not highly standardized due to operating conditions encountered.[8] As indicated above, it is also governed to some extent by the particular type of finish to be applied. For example, in preparing work for electroplating, an acid concentration and immersion schedule successfully utilized for hand-dipping operations may be totally unsuited for conveyorized setups. In the past, solutions of hydrochloric or sulphuric acid in concentrations from 5 to 10 per cent have been used.[3]

It may be noted here, too, that the reduction in the intensity of alkaline cleaning needed to avoid copper-plate blistering should be accompanied by a reduction in the acidity of the acid dip which follows. With cleaners used in concentrations of 4-6 oz./gal., the use of sulphuric dips should be avoided.[3] Hydrochloric acid may be used in volume percentages of 1 to 3 per cent.[3] The use of acetic acid with very dilute cleaners also has been suggested.[10]

In plating departments and shops utilizing hand operations where dipping time is definitely controllable, immersion periods of the order of 5 seconds or less are commonly employed, the customary practice being to immerse the parts until evolution of gas bubbles has begun. This procedure ensures that the alkaline materials which may be left on the surface are neutralized and removed.[3]

With conveyor operations having a fixed immersion period, acid concentration must necessarily be adjusted so as to avoid copious gas evolution and visible surface discoloration. While very inferior adhesion of electrode-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posited coatings inevitably results from failure to use an acid dip, it is equally true on the other hand, however, that poor results likewise are generally obtained when excessive or prolonged acid-dipping is practiced.

For the organic finishing preparation of zinc alloy die castings, a brief immersion of perhaps 5 seconds' duration in a cold 10 per cent hydrochloric acid solution has been recommended. This usually removes both the alkaline film and the oxide film. A hot water rinse follows this dip to expedite drying. Where the cleaning cycle is to be followed by chemical pretreatment, this acid dip may be omitted.[3]

Sulphuric, nitric, hydrochloric, phosphoric, acetic and sometimes hydrofluoric are other acids also used for deoxidizing or descaling, depending on the acid and the particular job at hand,[11] with concentrations ranging from 1 to 3 per cent.[12] In some cases an electric current is also utilized to speed up the rate of pickling and to assist as a mechanical scrubber by the rapid evolution of hydrogen gas.[11]

Where the problem is to produce a bright finish on zinc base alloys, one common practice consists of immersal of the work in chromic acid solutions containing chlorides and sulphates. Two typical examples are:[6 8]

Example No. 1—

Chromic acid ——30-40 oz./gal.
Sodium sulphate ——2-4 oz./gal.
Room temperature

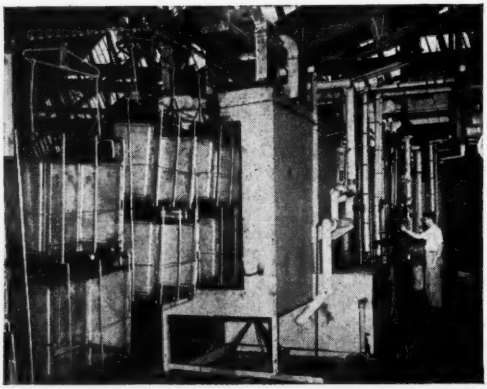
Parts are given a 5-30 second dip in this solution, followed by a cold water rinse. In the event a yellow film remains on the surface, immersion of the work in a solution of about 1 oz./gal. of sulphuric acid is suggested.

Example No. 2*—

Chromic acid ——25-60 lb.
Hydrochloric acid ——10 lb.
Water ——To make 100 lb.
Room temperature

*U. S. Pat. 2,125,458.

SPRAY PICKLING MACHINES



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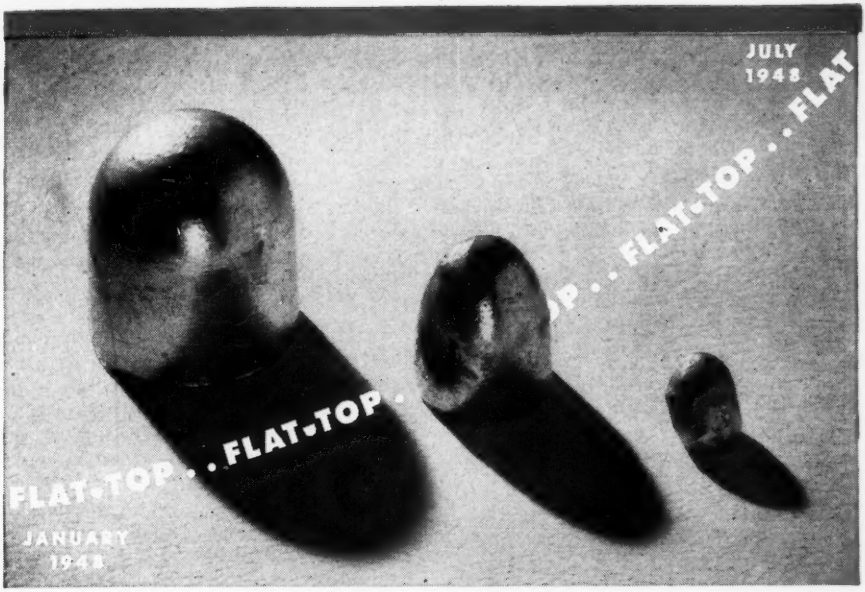

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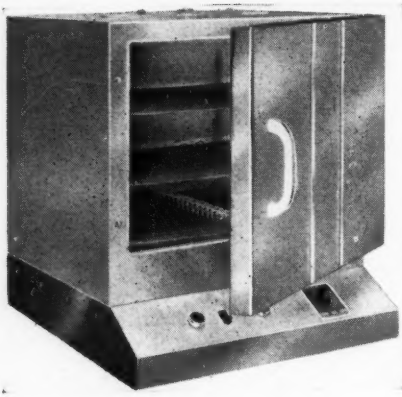

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This dip, in which work is submerged for 1 minute and then rinsed, should contain at least 15 per cent chromic acid and not more than 15 per cent hydrochloric acid. Upon removal from the solution, the parts will be seen to have acquired a dirty brass color, a condition that is remedied with a 60-second immersion at room temperature in a 10-70 per cent chromic acid solution.[6] [8]

Aluminum

In the fabrication of aluminum die castings, the work frequently acquires an adherent black or brownish film during the alkaline treatment. It is usually traceable to solution of the aluminum from the surface, the insoluble alloys remaining.[6] In some instances, the film may be swabbed off in the subsequent rinse,[13] but more generally a nitric acid-hydrofluoric acid dip is required.[5] The immersion of die castings for 15-30 seconds is usually sufficient to remove this film.

When preparing aluminum for electroplating, alkaline treatment is often followed by acid-etching or acid-cleaning to promote good plate adhesion. With zinc plating, for example, work is treated for 1 minute in 5 per cent hydrofluoric acid cold.

When applying chromium plate directly to aluminum, a similar acid treatment many times is given the work since here, too, a slight attack of the aluminum appears imperative to obtain an adherent deposit. In nickel plating aluminum, also, it is frequently advisable to follow alkaline cleaning with an acid cleaning, which also may be accomplished with the recommended hydrofluoric acid solution.[5] [14]

More recently developed surface preparation methods for the electroplating of aluminum are the zinc immersion process and the phosphoric acid anodic process. The first method is adaptable to automatic and still-tank plating, and also can be used for bulk or barrel plating.[4] An immersion

ENT for Every Plant or Product!

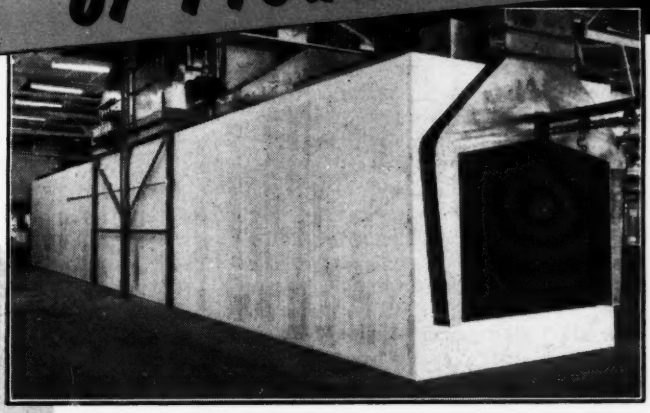

Photo shows indirect steam blast coil air-circulated body oven producing rapid drying. Note high-pressure air seals at both ends of oven.

The accompanying pictures are part of the Complete Finishing System for bodies, fenders, hoods, frames, wheels and miscellaneous parts located at the newly opened Lincoln-Mercury Division plant at St. Louis, Mo.

The design of all finishing equipment was coordinated with the purchaser's engineers to produce a new departmentalized theory of automobile production.

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layer of pure zinc is formed on the aluminum surface by treating the work in a sodium zincate bath after cleaning in suitable alkaline and acid pickling solutions. The electroplates deposited on the surface are quite satisfactory provided that proper attention has been given to the preparation of base metal before its immersal in the sodium zincate bath.[4]

The phosporic acid anodic treatment produces an aluminum oxide coating that makes possible direct electrodeposition of metallic coatings.[4] The performance of this coating may be explained by two of its characteristics. One is the fact that the anodic coating is extremely adherent; the other is that it is adequately porous, permitting the plating solution to penetrate the oxide layer. In the plating operation the metal is first deposited in the anodic coating in a dark form. As plating progresses, this dark coat is replaced by the natural color of the metal.

Pre-Paint Surface Preparation Practices

Oxidized surface finishes on aluminum, several of which serve as paint bases, also may be obtained through the use of still other chemical immersion methods. Included in this group are chromatizing and phosphatizing. Illustrated in Fig. 1 is a conveyorized machine designed to perform pre-paint phosphatizing operations.

Chromatizing forms a very thin, inert aluminum oxide film on the metal surface that effectively promotes firm paint grippage. Intended essentially as a paint base, the coating provides excellent corrosion resistance even when subsequently painted surfaces are abraded to the base metal. It also retards paint film breakdown. This chemical treatment is applied to aluminum by immersion in a 15-10 per cent solution of chromic acid maintained at a temperature of 140-150

This Faucet stood the Test for PERFECT ADHESION

under a tough stress!

This faucet, gripped in a vise, was hammered on the spout to this bent shape—to see how the chrome finish would hold. IT HELD! Not a break or crack showed on the bend in the spout—nor under it—nor where it was hammered nor where the vise held it. (Cut made from unretouched photograph.)

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deg. F. Work is allowed to remain in the solution for about 5 minutes. It is then rinsed in cold water and dried.[15]

Similar to chromatizing in that it forms a thin, inert coating (phosphate, in this case) on the metal, phosphatizing is accomplished by immersing the work in a 5-10 per cent solution of phosphoric acid (75 per cent) maintained at room temperature. The parts are left in the solution for about 5 minutes, after which they are cold-rinsed and then dried.[15]

There are a number of effective proprietary treatments of this particular type on the market today. Supplied commercially in concentrated form, they ordinarily require the addition of 2 to 3 parts of water to 1 part of concentrated solution for satisfactory application.[16]

From this series of discussions dealing with the principles, practices and problems of preparing magnesium, zinc and aluminum die castings for decorative finishing or protective coating, it may be readily understood that materials and methods in wide range are in commercial usage today. That great strides have been made in furthering the efficiency and economy of many prefinishing operations is a trite truism. There can be no question too that the science of surface preparation continues to move forward by leaps and bounds as it approaches new frontiers which, through exploration, promise a plethora of developments and improvements that will continue to push product-finishing standards ever higher from all standpoints.

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ELECTROCHEMICAL SOCIETY

Saturday Morning, September 25, 10:00 A.M.
Hotel Carter

1. "Crystal Structure and Surface Behavior."

   By DR. A. T. GWATHMEY, University of Virginia

   In his address, Dr. Gwathmey will point out that a metal surface is a complex of crystal faces, edges, corners, boundaries and disturbed layers. He will show how the surface properties are a composite of these many types of structure, and how the properties of these structures must be understood in order to understand the behavior of the surface.

2. "Developments and Trends in Industrial Catalysts."

   By DR. J. H. BOYD, Consultant

   Dr. Boyd will outline how the most significant recent developments in industrial catalysis have stemmed from hydrocarbon processing operations which are so large in scale and so extensive in scope as to afford large expenditures of time and money for process development and improvement. Starting with the fixed bed catalytic cracking of petroleum hydrocarbons, Dr. Boyd will trace developments, including the now well-known "Fluid" process which has become of major importance to the petroleum industry and is now finding application in the chemical field where Sherwin-Williams is using it in a plant for the manufacture of phthalic anhydride by the oxidation of naphthalene.

3. "Surface Reactions of Magnesium as an Anodic Material."

By W. S. LOOSE, Director, Laboratory Development Div., Magnesium Laboratories, Dow Chemical Company

A fundamental study of magnesium as a battery anode will be discussed by Mr. Loose who will present data obtained from wet cell tests which were designed to reveal anode performance. Effect of anode efficiency, voltage and corrosion characteristics of various cations and anions will be presented. Results of inhibitor usage will be discussed as well as the deleterious effects of various impurities such as iron in the metal. Influence of the alloying elements found in commercial, as well as many experimental alloys, on cell characteristics will be considered.

Saturday Afternoon, September 25, 2:00 P.M.

Hotel Carter

1. "Phosphate Coating of Metal."

By V. M. DARSEY, President, Parker Rust Proof Company

Mr. Darsey will point out a variety of applications of phosphating for producing non-metallic and inorganic coatings on metallic surfaces. Means of producing coatings having a wide range of thickness by cleaning methods modification, by adjustment of solution concentration, and by time of processing will be discussed. Since no electric current is used and formation of the coating is solely dependent on contact of solution with the metal surface, uniform coatings can be produced on irregular surfaces. In addition to outlining their use for corrosion prevention and paint bonding purposes, Mr. Darsey will describe use of the coatings for retarding wear on bearing surfaces, such as cylinder liners, pistons, rings, bores, camshafts and gears. He will also illustrate how phosphate coatings are being used in deep drawing of metals to permit faster and greater draws, to reduce power consumption, and to increase tool and die life by reducing friction.

2. "Principles of Powder Metallurgy."

By H. C. MILLER, Vice President, Charles Hardy, Inc.

Mr. Miller will place special emphasis on the surface phenomena encountered in this rapidly expanding field.

3. "New Developments in Organosols and Plastisols."

By. C. W. PATTEN, Manager, Coating and Adhesive Materials Div., Thermoplastic Dept., The Bakelite Corporation

Recent research and development work on plastic materials now under way in the Bakelite laboratories will be covered in the discussion.

Members of the Committee in charge of the Symposium include: K. S. Willson, chairman; N. M. Winslow, chairman of arrangements; R. A. Schaefer, program chairman; L. L. Malm, E. H. Ott, and B. A. Smith.

Symposium on Water and Waste Treatment

Engineering Society Headquarters, Cincinnati, Ohio

Sponsored by Ohio Valley Section

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

October 16, 1948

9:00 A.M. Registration, Engineering Society Headquarters

Morning Session, 10:00 A.M.

R. S. Tour, Head, Chemical Engineering Dept., University of Cincinnati, Presiding

Paper No. 1—"The Ohio Valley Water Sanitation Compact"
By HUDSON BIERY, member of the Ohio River Valley Water Sanitation Commission, Cincinnati, Ohio

Paper No. 2—"Sewage Disposal Program for the Metropolitan Area of Cincinnati and Method of Financing"
By H. H. KRANTZ, City Engineer of the City of Cincinnati

Paper No. 3—"The Effect of Pulp and Paper Mill Equipment Improvements in Reducing Stream Pollution"
By DR. HARRY W. GEHM, Technical Advisor, National Council for Stream Improvement, of the Pulp, Paper, and Paperboard Industries, New York, New York

Paper No. 4—"Water Resources of the Cincinnati Area"
By ALFRED LeFEBER, Consulting Engineer, Cincinnati

Noon Luncheon

Speaker: C. C. Ruchhoft, Sanitary Engineer, U. S. Public Health Service, Cincinnati, Subject: "Natural Purification of Streams"

Afternoon Session

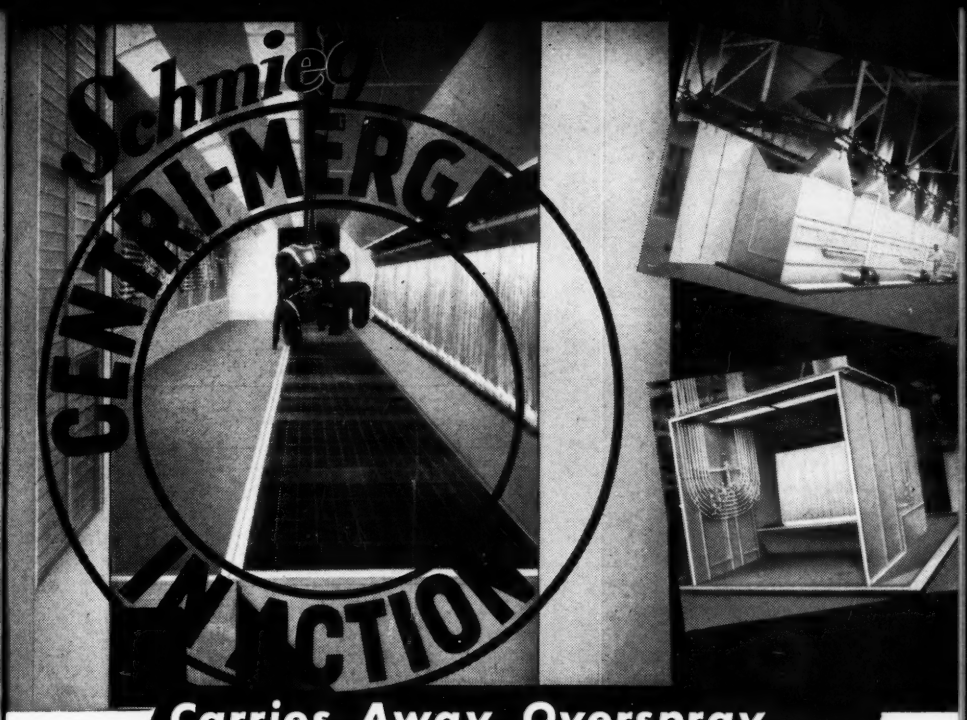
Paper No. 5—"Accelerated Waste Treatment Methods"
By E. G. KOMINEK, Chemical Engineer, Infolco, Inc., Chicago, Illinois

Paper No. 6—"Stream Sanitation Program of the Tennessee Valley Authority"
By F. W. KITTRELL, Sanitary Engineer, The Tennessee Valley Authority, Knoxville, Tennessee

Paper No. 7—"Stream Pollution Control Program in Ohio"
By FRED WARING, Chief Sanitary Engineer, Ohio State Department of Health, Columbus, Ohio

Paper No. 8—"Waste Treatment of Distillery Effluent"
By ALEX B. DAVIDSON, Sanitary Engineer, Schenley Distilleries, Inc.

The members of the Symposium Committee are: R. S. Tour, Univ. of Cincinnati, program chairman; Stanley Baechle, Emery Industries, registration; Robert Head, Procter & Gamble, publicity; Robert Paul, Emery Industries, arrangements and finance; and Clark B. Rose, president, Ohio Valley Section, A.I.Ch.E.



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OCTOBER 13-15

IN welcoming all porcelain enamel technicians, supervisors, and plant managers to the Tenth Annual Forum of the Porcelain Enamel Institute, C. D. Clawson, P.E.I. president and president of Ferro Enamel Corporation, has stated that this meeting will be one of the most important in the Institute's 10-year history. Postwar enameling developments have been tested in production over a period of time sufficient to make possible their accurate evaluation. Mr. Clawson has announced that Institute membership has increased 40 per cent since the last Forum was held. This increased participation and interest reflect the success of the P.E.I. Forum in accomplishing its objective of bringing to shop personnel and plant management information on technical progress and improved processing methods in porcelain enamel plant operation.

Program

Wednesday Morning, October 13

9:00 A.M.—Registration

10:30 A.M.—Meeting of Committees

Wednesday Afternoon, October 13

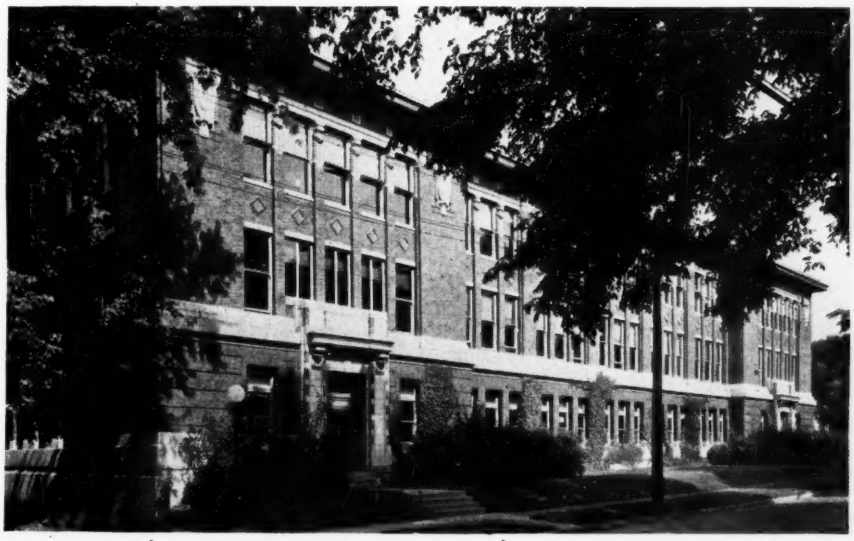
Dr. A. I. Andrews, Head, Department Ceramic Engineering, University of Illinois, Presiding

1:30 P. M.—Address of Welcome

By M. L. ENGER, Dean, College of Engineering, University of Illinois

Response

By C. D. CLAWSON, President, Ferro Enamel Company; president, Porcelain Enamel Institute



Ceramic Engineering Building, University of Illinois

2:00 P. M.—Panel Discussion: Titanium Enamels

1. Review of Titanium Enamel Development and Discussion of Its General Properties

   By D. R. GOETCHIUS, Ferro Enamel Corporation

2. Application of Titanium Enamels

   By HAROLD WILSON, Vitreous Steel Products Company

Thursday Morning, October 14

Dr. J. J. Canfield, Supervising Metallurgist, Research Laboratories, Armco Steel Corporation, Presiding

9:30 A.M.—Panel Discussion: Application of Cover Coats Directly on Steel

1. Special Steels and Preparation for Enameling

   By FRANK R. PORTER, Ceramic Engineer, Inland Steel Company

2. 1,500 Deg. F. Type Enamels

   (a) Shop Processing of Titanium Enamels Direct to Titanium Steel

   By JOHN L. LANNAN, Westinghouse Electric Corporation

   (b) Pickle and Millroom Practice and Procedure for Application of Titanium Enamel Direct to Titanium Steels

   By JOHN C. SWARTZ, Westinghouse Electric Corporation

   (c) Zirconium and Other Types

   By M. E. McHARDY, Hussman Refrigeration, Inc.

3. 1,300 Deg. F. Enamels, One and Two Coats

   By B. D. BRUCE, Chicago Vitreous Enamel Product Company

Thursday Afternoon, October 14

Dana Chase, Editor and Publisher, "Finish," Presiding

1:30 P. M.—Quality Control of Manufactured Product Through Incentives

By WALDO W. HIGGINS, Chief Engineer, A. O. Smith Corp., Kankakee Works

Control of Liquid and Airborne Wastes from Porcelain Enameling

By H. S. KLINE, Industrial Hygiene Engineer, Frigidaire Division, General Motors Corporation

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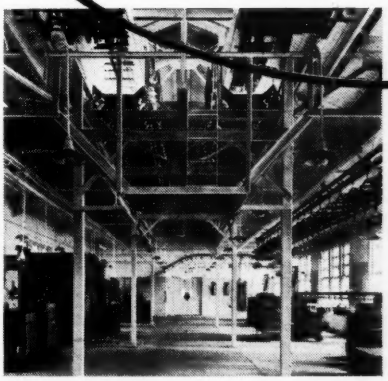

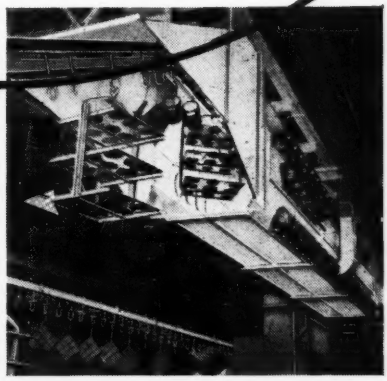

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Personnel Safety and Health Hazards in the Enamel Plant

By RUSSELL FRANK, Ferro Enamel Corporation

Budgeting Expenses in the Enamel Plant

By C. S. PEARCE, Secretary, American Ceramic Society

7:00 P. M.—Annual Forum Banquet, Urbana-Lincoln Hotel

Friday Morning, October 15

Dr. E. E. Marbaker, Senior Fellow, Mellon Institute of Industrial Research for O. Hommel Company, Presiding

9:30 A.M.—Design, Construction and Maintenance of Burning Tool Equipment

By A. RASMUSSEN, The Fahralloy Company

Survey of Drying Practices in the Porcelain Enamel Industry

By GEORGE N. TUTTLE, Ceramic Engineer, Benjamin Electric Manufacturing Company

Common Defects in Porcelain Enamels Occurring in Processing ing and How to Repair Them for the Finish Line

By JOHN L. McLAUGHLIN, Chicago Vitreous Enamel Prod. Company

Application of Ceramic Coatings to Aircraft Power Plant Construction

By MAJ. R. A. JONES, Air Material Command, U.S.A.F.

Development of Porcelain Enamel Coatings on Metals for Navy Shipboard Service

By FORREST R. NAGELY, Materials Engineer, Protective Coating Group, Research and Standards Branch, Bureau of Ships, U. S. Navy

Progress Report on Porcelain Enamel Research at the National Bureau of Standards

By ALLEN C. FRANCISCO, P.E.I. Research Fellow, National Bureau of Standards

Friday Afternoon, October 15

1:30 P. M.—Board of Experts

Master of Ceremonies:

DR. G. H. McINTYRE, Director of Research, Ferro Enamel Corporation

Members of the Board:

A. S. AULT, Mgr., Sales and Service, Chicago Vitreous Enamel Product Company

R. D. BECK, Sales Engineer, O. Hommel Company

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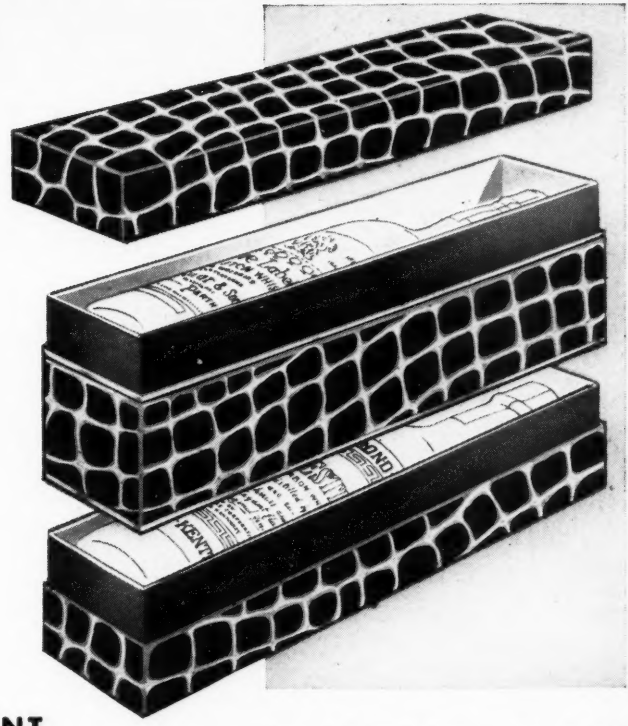

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A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

THIS MONTH . . . Passivation Important in Surface Finishing of Stainless Steel . . . Production of Consistently High Quality Wrinkle Finishes Requires Proper Control . . . Power Transmission in the Plating Room . . . Pointers on Buffing Aluminum.

Passivation Important in Surface Finishing of Stainless Steel

ONE very important principle was brought out by K. M. Huston, Armco Research Laboratories, Baltimore, Md., in speaking before the 1948 Northeastern Regional Meeting of the American Electroplaters' Society, Rochester, N. Y.; namely, the importance of passivation as a final finishing treatment in surface finishing of stainless steel. The importance of considering passivation in conjunction with each final finishing operation, whether it be scale removal, tumbling, polishing, pickling, grinding, sandblasting, or any method which tends to remove the passive film, was emphasized as the president of the American Electroplaters' Society discussed the various procedures involved in surface finishing of stainless steel before the education session of the assembled group of platers.

The surface of stainless steel presents a unique phenomena in that it is normally a passive transparent film of a group of oxides which serves to retard corrosive action. Since this film recurs when stripped off or penetrated, it serves to provide stainless steel with the through-and-through non-corrodability of the noble metals. However, it was brought out by Huston that it is quite possible for a fabricator, unfamiliar with the proper finishing procedure for stainless steels, to produce an article which will show superficial rusting in a short time.

Solutions recommended by Huston for passivation of stainless steels consist of 20 to 40 per cent (by weight) nitric acid at 120 to

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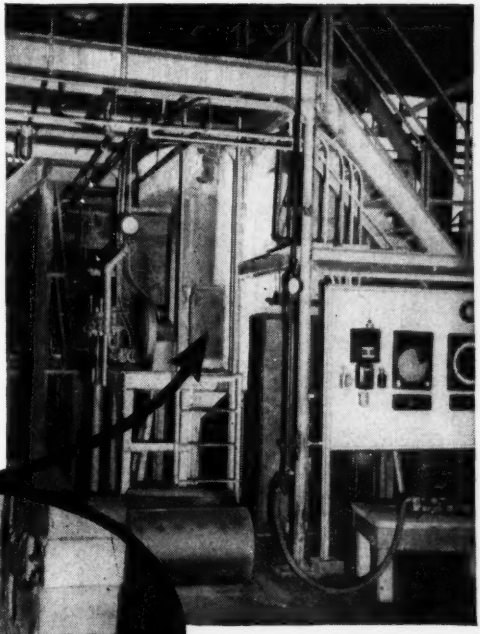

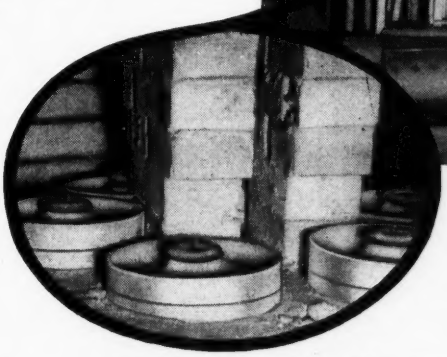

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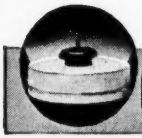

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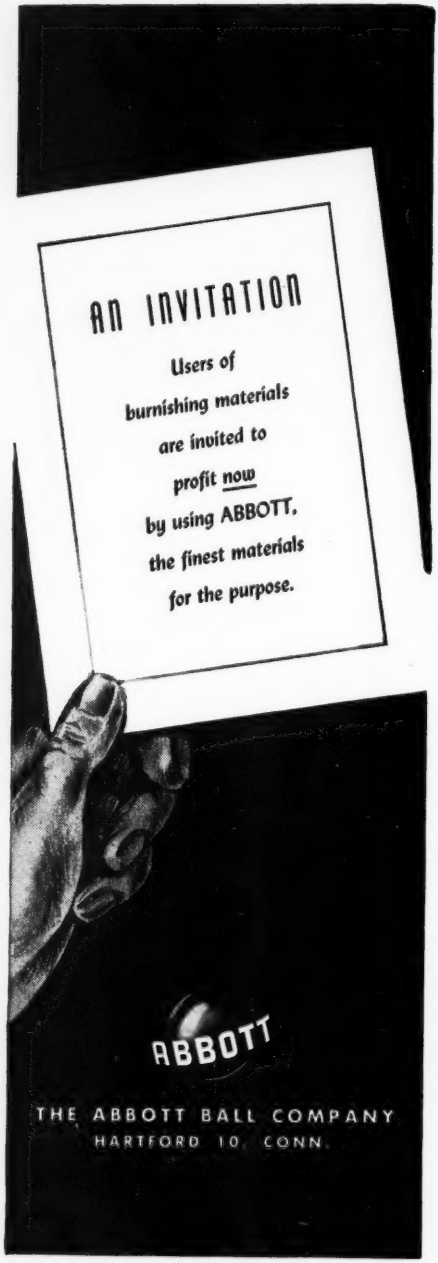

140 deg. F., for 15 to 30 minutes, and an 18 to 22 per cent (by weight) solution of nitric acid, to which has been added 1½ to 2½ per cent sodium bichromate, used at 110 to 120 deg. F. for 15 to 30 minutes. The addition of bichromate prevents flash attack on the surface, which will result in a dull gray appearance. The first solution was recommended for the ferritic or non-hardenable straight chromium grades, and the austenitic or non-hardenable chromium-nickel grades. The latter solution is preferred for the martensitic, or the hardenable straight chromium grades and for highly polished parts. Following passivation, the parts should be rinsed thoroughly with cold water.

The prime function of the nitric acid passivation treatment is to clean the stainless steel chemically, and without harm. The removal of iron particles, imbedded in the surface during fabrication, is of particular importance. Of less importance is the possible reinforcement of the oxide film associated with passivity. A properly cleaned stainless surface rapidly becomes passive in air or many other oxidizing environments.

Further indications of the interest in the general subject of passivity were evidenced by the presentation of two papers as a part of the corrosion symposium at the spring meeting of the Electrochemical Society in Columbus, Ohio, having to do with the passive film on stainless type metals and alloys and the mechanism of passivity. A study of isolated films from passive stainless steels was discussed by E. M. Mahla and N. A. Nielsen, Engineering Research Laboratory, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. The passivity of chromium was presented in a paper by Norman Hackerman and D. I. Marshall, University of Texas, Austin, Texas, based on research carried out with the Office of Naval Research.

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The work described by Mahla and Nielsen was presented as a continuation of earlier studies and offered additional evidence that the passivity of stainless steel results from surface oxide film formation. By the use of a bromine-methanol solution, the authors were able to isolate passive films from electrolytic chromium, ferritic and austenitic stainless steel, and from the alloys "Nichrome" V and "Inconel." The films were very thin and transparent, and were found to be formed on initially film-free (pickled) surfaces by air exposure and by passivation treatments in nitric acid and in nitric acid-dichromate solutions. The authors stated that they believed this work represented the first time that oxide films have been isolated from stainless steel specimens known to be passive as a result of air exposure or low temperature passivation treatments. It is believed that the techniques used should stimulate further research into this general subject of the mechanism of passivity.

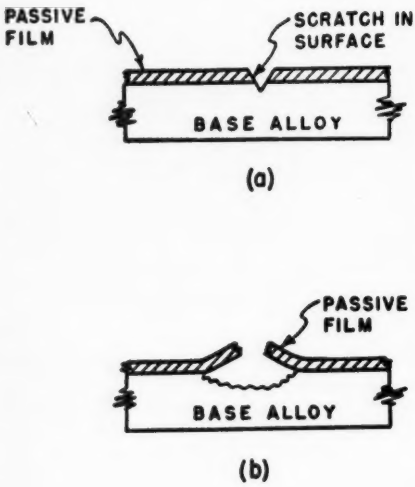

Fig. 1—Illustration indicates action of bromine-methanol solution described by Mahla and Nielsen on passivated stainless steel. (a) Cross-section of scribed, passivated surface; (b) same cross-section after short exposure to solution.

In the stripping technique described by Nielsen, in his presentation of the joint paper, passivated specimens were scribed with a sharp tool to expose film-free stainless surfaces and were immediately immersed in the bromine-methanol stripping solution. The concentration of the stripping solution most generally used consisted of 10 ml. of bromine per 100 ml. of methanol, but the concentration was found not to be critical. The concentration of corrosion along the scratch lines results in undermining of the passive film in the manner as shown schematically in Fig. 1.

It was found by Mahla and Nielsen that films produced by the nitric-dichromate treatment were the most difficult to remove, and rather long stripping times, 24 hours or more, were necessary to isolate pieces of film of a size convenient to handle and to collect. Films on 18-8 stainless steel, passivated in 30 per cent nitric acid, or merely by air exposure, were stripped more easily, indicating that the oxide films so formed were not so protective. Passivated 15-16 chromium specimens were stripped most readily, a few hours being sufficient to undermine completely the film on a sample 1 inch wide x 2 inches long. Samples of isolated films were collected by fishing them out of the stripping solution with a piece of 200 mesh stainless wire screening. Washing of the film was accomplished by transfer through several successive dishes of methanol.

A study of passive films on 18-8 stainless steels led to the conclusion that passive films are definitely reaction products of the metal and the passivating medium. Prolonged exposure of stainless steel in nitric acid, or nitric acid containing dichromate, at room temperature, or boiling temper-

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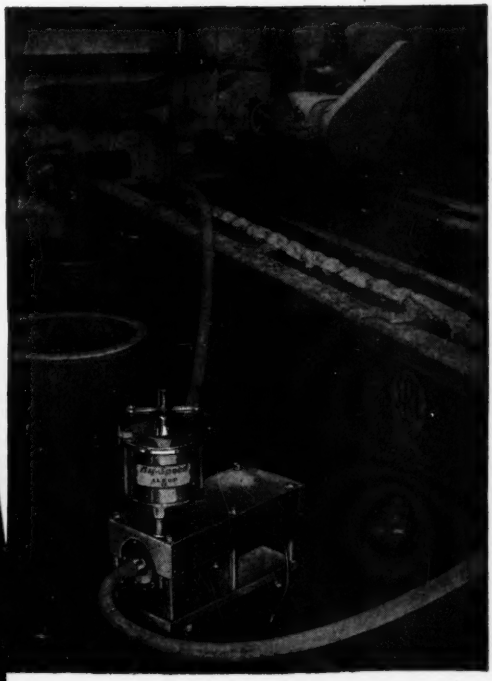

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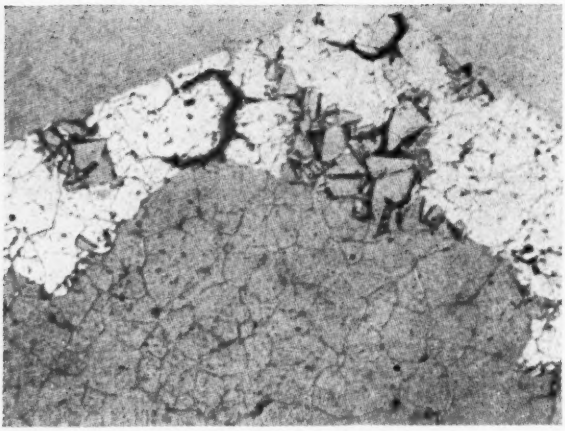

Fig. 2 — Photomicrograph showing oxide film from 18-8-S stainless steel colored to first-order blue interference tint by nitric acid-dichromate passivating solution treatment. Magnification 100X. (*Illustration courtesy J. Electrochem. Soc.*)

ature, resulted in the formation of oxide films of sufficient thickness to show interference tints such as shown in Fig. 2. However, according to Mahla and Nielsen, one of the most important things that these tests have shown is that definite passivation conditions are necessary to build passive films of optimum protective power and corrosion resistance. This confirms breakthrough potential data, previously presented by the authors, which also indicated such an optimum protection. The films of necessity must be very thin, too thin to show interference tints. The curve in Fig. 3, presented by Mahla and Nielsen, gives average percentage weight losses (four specimens for each passivation time were tested) of 18-8-S stainless steel in 10 per cent ferric chloride vs. time of passivation in boiling 5 per cent nitric acid plus 0.5 per cent dichromate. The minimum in the curve indicates the optimum time of passivation.

It was reported that all the passive films, when investigated by electron diffraction studies, appeared to have a similar type of crystalline or semi-crystalline lattice structure. The chemical analyses of passive films from type 430 (15-16 Cr) and type 317 (18-8-S Mo) stainless steels indicate that both chromium and iron are the primary constituents of the films. It was postulated that these are present together in solid solution, probably in a spinel type of lattice. The films from chromium passivated in nitric acid were shown to contain a high percentage of chromium, probably as chromium trioxide.

Some observations regarding the role oxide films play in passivity of chromium were brought out in the paper on passivity of chromium by Hackerman and Marshall of the University of Texas. Surfaces of chromium, treated with nitric acid, and then oxidized in air at various temperatures, were examined by electron diffraction and these results were correlated with results of electrode potential measurements on other samples subjected to the same treatments. The potentials taken at the time of immersion in saturated potassium chloride

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were found to be a function of the temperature of oxidation, with a maximum noble potential corresponding to an invisible oxide film and a minimum corresponding to a surface on which oxide could not be detected.

* * *

Production of Consistently High Quality Wrinkle Finishes Requires Proper Control

IT has been pointed out by E. A. Zahn, Works Laboratory, General Electric Company, Schenectady, that proper control is important in the application of wrinkle finishes. (See also The Iron Age, January, 15, 1948). This is due to the fact that the elements that affect the pattern, from variations in the enamel itself to the type of pattern selected and its ultimate use, are so complex that control in the usual sense often becomes impossible. Production of consistently high quality finishes requires careful attention to enamels, base metal, product design, application technique, drying atmospheres and time and temperature.

One of the factors pointed out is that various base metals may cause wrinkle enamels to behave differently. Of these, sheet and cast brass were cited as among the most difficult to handle. Such finish variations may be caused by the heat conductivity characteristics of each metal. As opposed to the high heat conductivity of aluminum or its alloys, the low heat conductivity of brass allows time for the wet enamel to gather on edges and follow scratches and other defects. Also, there are cases where a wrinkle finish on brass may minimize surface imperfections in one case and exaggerate them in another.

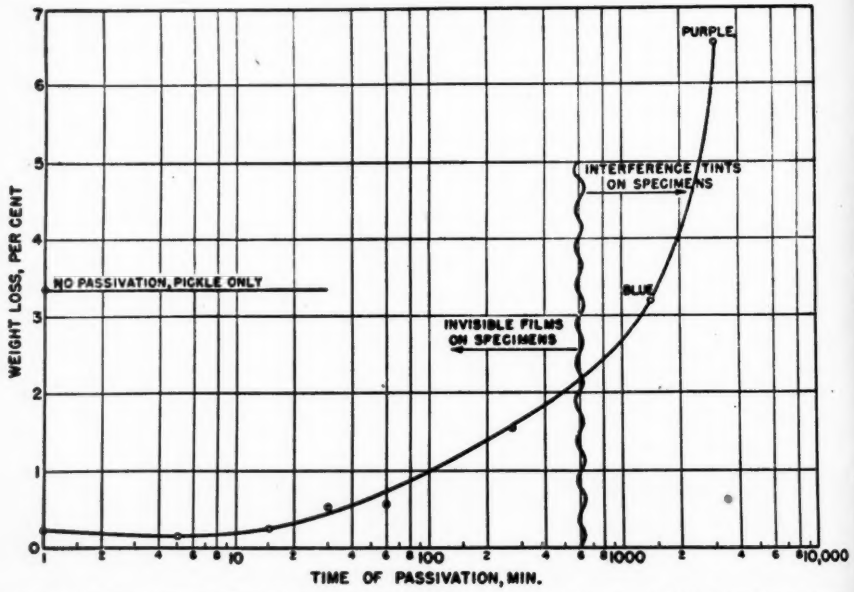

Fig. 3—Curve showing effect of time of passivation on weight losses of 18-8-S stainless steel tested in 10 per cent ferric chloride. The minimum in the curve indicates the optimum time of passivation.

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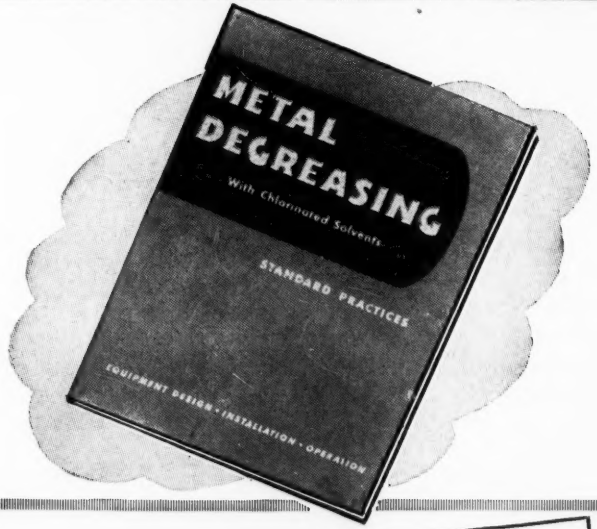

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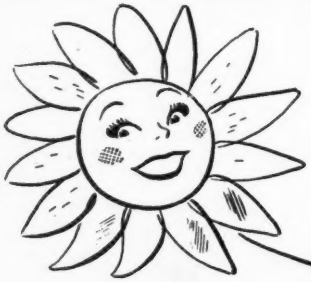
It has been pointed out that base metal dimensions may also play an important part in the success of the wrinkle finishing operation. Thus, where there are great differences between weights and thicknesses of the metal parts being assembled, the pattern match is apt to be poor, due to the fact that the rate at which heat is accumulated on the work is directly proportional to the weight of the metal involved. One help, in connection with this difficulty, is the use of finer patterns or coordinating the out-of-oven time to compensate for the weight differences. Differences in surface texture may also influence the character of the wrinkle finish obtained; thus, castings have a porous surface that sheet metal does not have, and the same wrinkle pattern applied to each may produce different results. The shape of the structure being finished and the accessibility of its surfaces also help determine the final pattern that is produced during the finishing operation.

Control of application properties of the enamels used is a desirable practice. Dried wrinkle finishes cannot be accurately measured in terms of film thickness. Film thickness is therefore in direct relation to the amount of wet material applied, and as the wet film thickness increases or decreases, pattern depth and size change accordingly. This difficulty can be minimized by a number of methods, including viscosity control, temperature control, and operator motion study. Viscosity of the enamel is an important factor. It is important that viscosity control be exercised at the point of application. As the temperature in the material drops, the viscosity increases, so that at lower temperatures a lesser volume of paint leaves the gun because of this viscosity increase. To produce uniform work, temperature differences should be compensated for by varying application speed.



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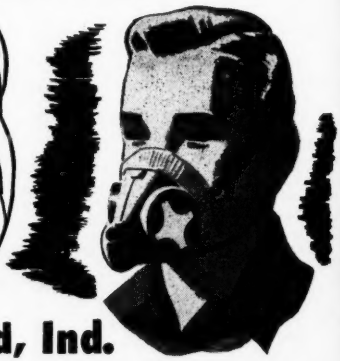

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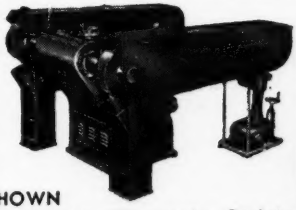

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Production techniques such as drying time, oven atmospheres, and spray methods may all influence the type of wrinkle finish produced, according to Zahn's experiences. It was pointed out that most wrinkle enamels will produce the maximum in pattern distinction or depth when the heat is applied suddenly. Also, care should be taken to see that the width adjustment of the spray gun is in accordance with the size and shape of the work, to avoid streaks on the work due to insufficient overlapping of the spray.

* * *

DC Power Transmission in the Plating Room

IN reading a paper prepared by George L. Nankervis for presentation at the 1948 Northeastern Regional Meeting of the Buffalo, Rochester and Syracuse branches of the American Electroplaters' Society, W. E. Stadel, George L. Nankervis Company, reported on some of the recent work that has been carried out on the substitution of aluminum bus bars for copper in plating installations. Also discussed were some results on measurement of current-carrying capacity of plating racks.

In considering the use of aluminum bus bars, according to Stadel, some of the advantages may be summarized as follows:

1. No tinning is required on aluminum bus bar installations.
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6. The cost of aluminum metal for a typical bus bar installation is about one-half that of copper, at present-day prices.

According to Stadel, tests that have been recently carried out have led to the belief that the scale of 1000 amp. per sq. in. in designing plating racks is too conservative. Indications are that 1500 amp. per sq. in. may be safely used, and that 2000 amp. per sq. in. is well within reason on some types of racks.

Results were also discussed on tests which were carried out on the resistance present in different types of joints used in the manufacture of plating racks. In this experiment, it was stated that a Kelvin Bridge was used, and the joints to be tested were made of ¼ x 1 inch copper bar, readings being taken 4 inches on each side of the joint. Thus, as was pointed out, 8 inches of copper bar were involved, including the joint. A reading was taken of 8 inches of copper bar with no joint and it was found to be 20 micro-ohms resistance. The results found for the joints are summarized below:

	Micro-ohms resistance
Bolted and soldered joint	20½
Riveted and soldered joint	20½
Bolted joint only using steel bolts	24
Silver soldered joints	22
Riveted only	25
Brazed joint	24
Soft soldered joint	22

Thus, in summarizing the conclusions that were drawn from these tests, Stadel stated that when the resistance

NON-INFLAMMABLE
ELECTRO
NON-INJURIOUS
COLD STRIPPER
FASTEST in Action
LOWEST in Price
WRITE FOR TESTING SAMPLE OR ORDER
5-GALLONS AT DRUM PRICE
Allied Finishing Specialties Co.
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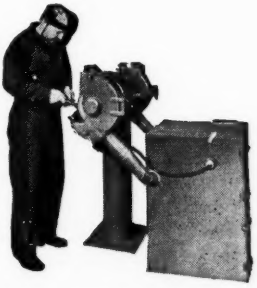
are doing a *neat job* on these surface grinders

Here is a neat, attractive and efficient dust collecting installation. The TORIT No. 81 Dust Collector does not interfere with the accessibility of either machine. A minimum of piping connects it directly to the grinding hoods. This is the type of set up that pays dividends in good working conditions and high quality output.



Compact, self-contained TORIT Dust Collectors range in size from ⅓ to 5 HP. They are easy to fit into your production layout, and models for all standard dust collecting jobs are available for immediate delivery. For details and the latest TORIT catalog, write:

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The DUST-ALL
TACK RAG
Collects Dust and Dirt Too!

DUST settles on surfaces and unsatisfactory finishes result. The *Dust-All* Tack Rag collects Dust. It is the quick economical means to assure good finishes.

Get the *Dust-All* Tack Rag in the Red Checkered Bag at your Dealers or write us.

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of the 8-inch copper bar, which is 20 micro-ohms, is subtracted from the values found for the various joints, the net resistance is almost negligible. Another interesting result of tests of this type is that no difference in resistance was found between two sections of copper, which were copper riveted and soldered, as compared to that of a joint which was steel bolted and soldered. Data such as these are of value to the production man in the plating room having responsibility for the design and construction of plating racks for various plating procedures involved in the overall finishing set-up.

* * *

Pointers in Buffing Aluminum

THE production man concerned with finishing operations which may involve the buffing of aluminum should keep in mind that aluminum and its alloys are usually softer than many of the commonly-used metals, and thus they will usually require lower wheel speeds and finer abrasives. Proper lubrication is also important with aluminum because of its high coefficient of friction. The difficulties frequently encountered in the buffing of aluminum are the formation of pits, surface roughness, and buffing clouds. According to information developed by the Aluminum Company of America, these difficulties may be corrected by attention to one or more of the following factors: hardness of buff, buffing compound, peripheral speed, and pressure against buff.

In general, the harder the buff the bettter the cutting qualities which will produce a smooth surface. However, there is a greater tendency to form pits or cloudy or streaked areas. Hardness in a buff may result from the following factors: material of high thread content, close spirals in stitching and short stitches, few or no spacers between discs, few or no spac-

Here's real production efficiency and economy for manufacturers with mixed metal production! No more need for segregation or separate treatments for steel, zinc, aluminum, or their alloys. A single Bonderite line treats them all —at the same time.

The single Bonderite line builds a coating that's an anchor for paint, resists corrosion, and assures lasting fine paint appearance on all these metals. Does it quickly, economically, dependably. It's as simple and easy to operate as Bonderizing a single metal.

Get these advantages of economy, production simplicity, and full protection for your mixed-metal production. Bonderize before painting!

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

Parker

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BONDERIZING Holds Paint to Metal . . . PARKERIZING Inhibits Rust . . . PARCO LUBRIZING Retards Wear on Friction Surfaces

ers between sections, and high peripheral speed.

Where pitting and clouding difficulties exist, attention should be directed toward softening of the buff. The type of buff in which all the cloth is exposed to the cutting surface on a bias provides a soft buff.

It is a good rule to select the buffing compound for the particular job on the basis of test. Tripoli, silica or a mixture of tripoli and silica, held together with a grease binder or a water soluble material are the most common cutting materials. Abrasives used in buffing compounds may vary considerably in hardness and cutting properties. The grease binders are also varied, depending on the melting point desired. With decrease in the melting point of the binder there is less danger of pitting and overheating and a decrease in luster, but the cutting quality and tendency toward cloudiness are increased.

The size and shape of the work being done determines the diameter and face of the buffing wheels. Operating wheel speeds should normally range between 7000 and 7500 feet per minute. High peripheral s p e e d s increase effective buff hardness and improve cutting qualities but increase the tendency for pitting and formation of cloudy areas. High pressure against the buff increases the cutting rate and also increases the tendency for pitting and cloud formation. Generally speaking, the pressures used in buffing aluminum and its alloys are less than those used for the harder metals.

An alarm clock that glows in the dark has been announced by Telechron. The clock case is molded of "luminous" plastic furnished by Dow Chemical Co., and it glows in the dark all night. The hands and dial markings are "luminous" painted.

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SPEED UP PRODUCTION AT LOWER COST
Batch Type oven in various sizes, including overhead conveyor systems. Automatically controlled. Approved by the N. Y. Board of Standards and Appeals.
Wide selection of metal finishing equipment on hand.
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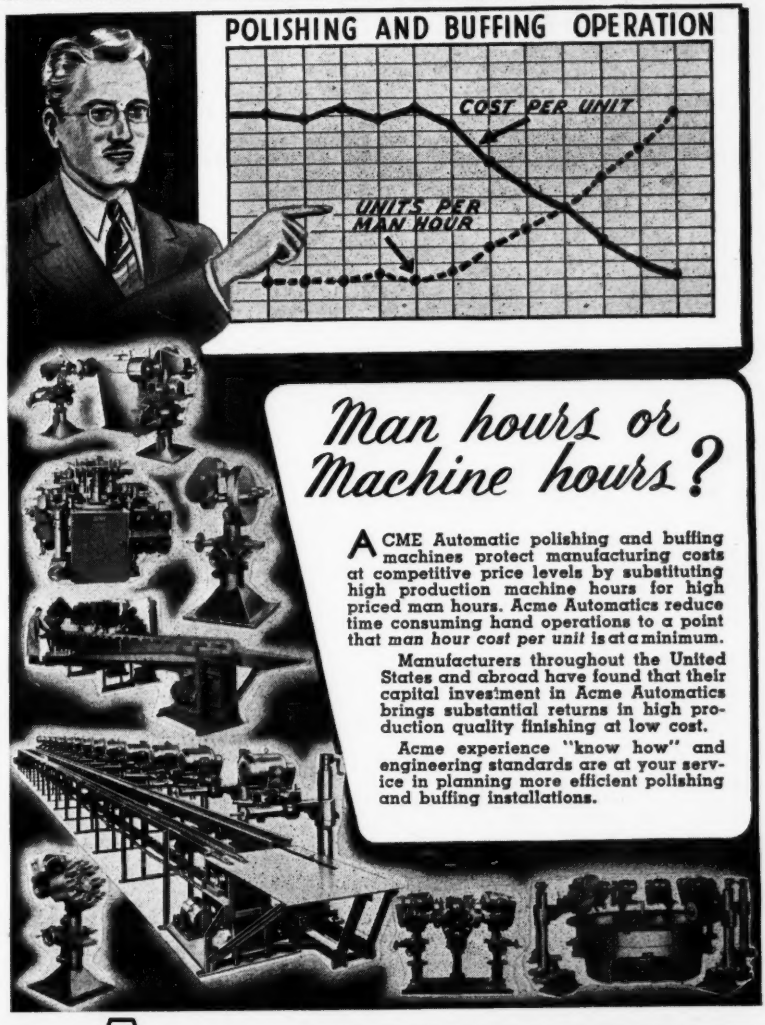

Man hours or Machine hours?

ACME Automatic polishing and buffing machines protect manufacturing costs at competitive price levels by substituting high production machine hours for high priced man hours. Acme Automatics reduce time consuming hand operations to a point that *man hour cost per unit* is at a minimum.

Manufacturers throughout the United States and abroad have found that their capital investment in Acme Automatics brings substantial returns in high production quality finishing at low cost.

Acme experience "know how" and engineering standards are at your service in planning more efficient polishing and buffing installations.

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Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS

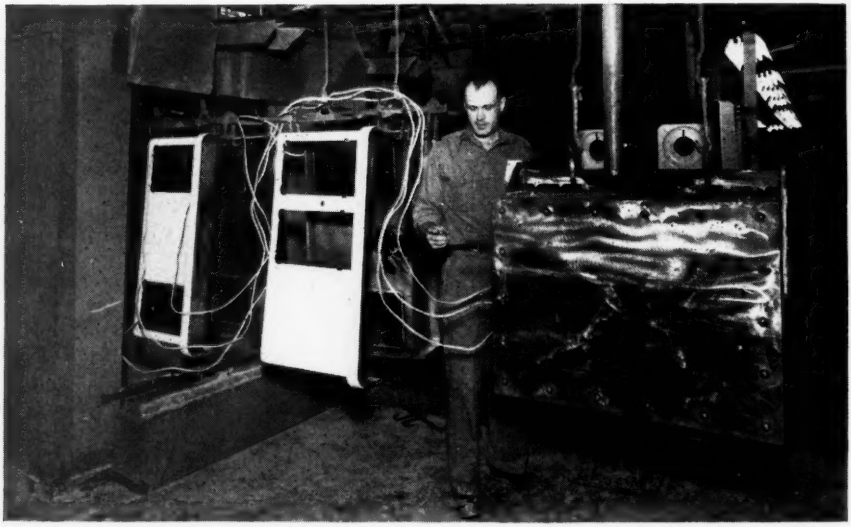
PRACTICAL APPLICATIONS *of Modern Products*

Ferro Improved Recorder Determines Temperature Gradients

THE successful firing of porcelain enameled ware in continuous furnaces is dependent upon reasonably uniform temperatures at various furnace levels. Some porcelain enamels possess wider firing ranges than others but it is always important, especially when firing large objects such as refrigerator shells or large porcelain enamel signs, that the furnace temperature near the bottom of the furnace be approximately the same as that near the roof.

To measure temperatures existing at various furnace levels so that corrective action could be initiated if necessary, the Ferro Enamel Corporation introduced in August 1947 a three-point temperature recording instrument for determining temperature gradients in continuous porcelain enameling furnaces. The instrument measured and recorded continuously

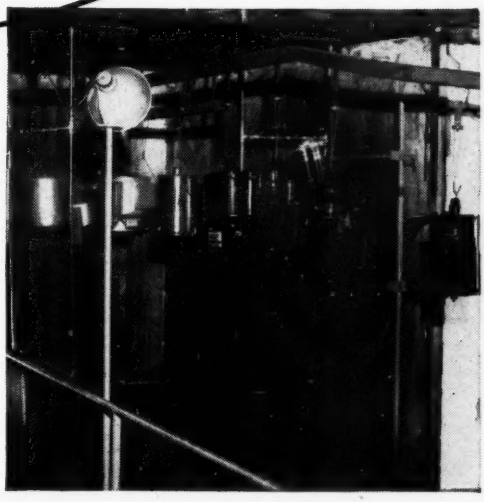
Fig. 1—Illustration shows Ferro Temperature Recorder suspended on furnace chain. Temperature gradients (both horizontal and vertical) are taken at three points on the ware.



versatility! flexibility!

FOR EXAMPLE:

This Ransburg installation paints four different oil heater parts automatically . . . one attendant handles more production in less space than a hand spray crew before . . . and three times as many parts are painted per gallon of enamel.



Spray-painting a variety of parts on the same *automatic* set-up is not unusual with the Ransburg Electrostatic Spray Process.

Why? The electrostatic "field" created by Ransburg electrodes pulls the paint on. Electrostatic forces do most of the work.

As a result—by *pulling* the paint on—Electro-Spray not only paints a variety of parts on the same automatic set-up, it also reduces your paint bills by 40 to 60 per cent . . . cuts booth maintenance to a fraction . . . assures quality control, and minimizes rejects.

No wonder manufacturers are saying "we save more per dollar invested than from any other recent plant improvement."

RANSBURG

RANSBURG ELECTRO-COATING CORP.

Indianapolis 7, Indiana

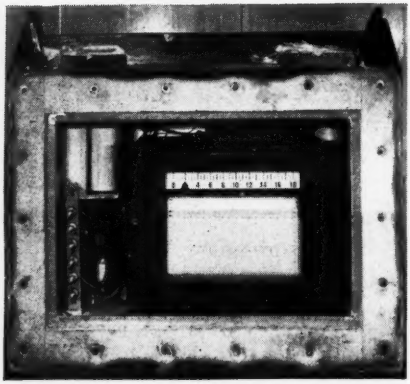


Fig. 2—A view of the recording instrument mounted in the heavily insulated box which protects the instrument from the effects of the high temperatures through which it must pass

the temperatures existing at three levels in the furnace. The measurements were recorded as the testing apparatus "rode" around the furnace chain, making possible an accurate record of furnace conditions without the necessity of interrupting regular production. Other methods for measuring furnace temperature on a somewhat similar basis require that production be interrupted to some extent, and generally require recording instruments.

The results obtained with the instrument were so successful that a new and smaller box has now been built. The new unit can be used on the smallest continuous porcelain enameling furnace—on any chain center from 32 inches down to 16 inches without a major tool revision on the furnace chain. In addition, the new unit is considerably lighter and occupies less space than its predecessor. Battery sources for operation have been materially improved, thus adding to the effectiveness of the device.

With the aid of the Ferro Temperature Recorder, the porcelain enameler may check his furnaces regularly or in cases of emergency, and thus secure information upon which to base changes in burner settings or adjust-

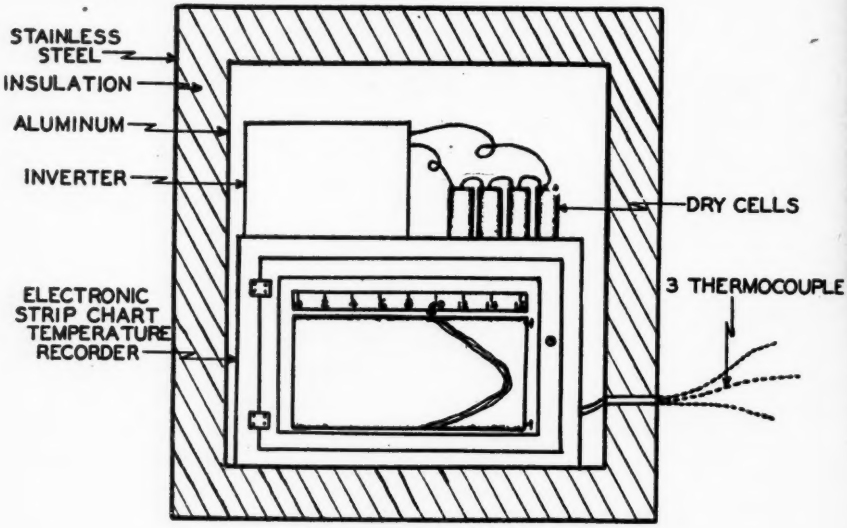


Fig. 3—Drawing shows a sectionalized view of the recorder.

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to be enameled, japanned, painted, etc.

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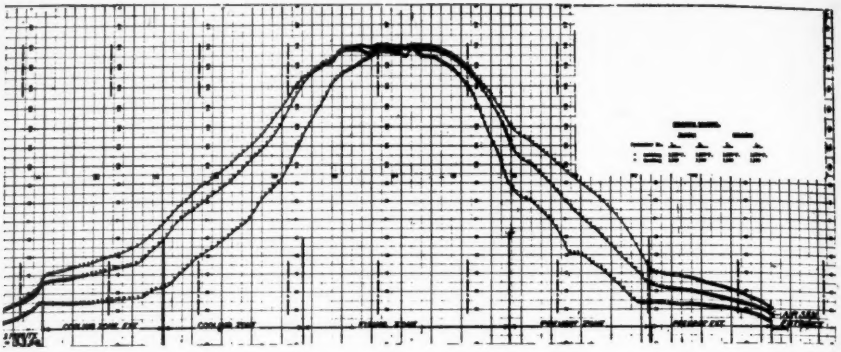


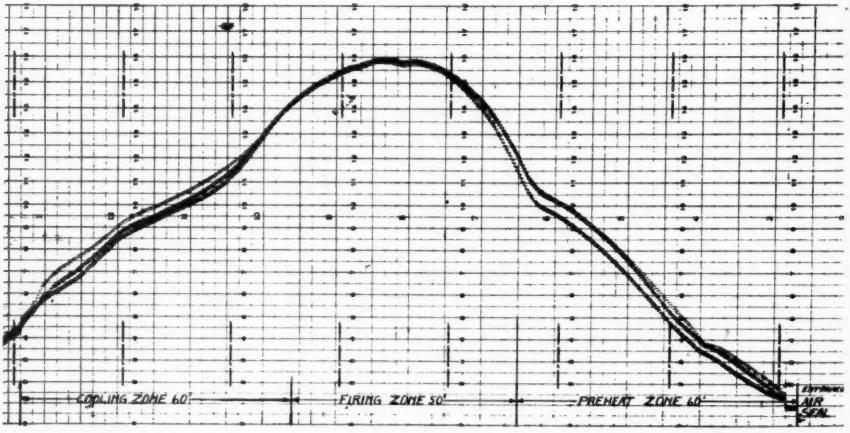
Fig. 4—Illustration shows a typical set of temperature gradient curves recorded by the Ferro Temperature Recorder. This set of curves represents furnace conditions before adjustments were made to the firing mechanism.

ments. He is thus furnished with an additional control device, making possible more accurate control of the porcelain enameling process. Figure 4 illustrates graphically that variations in furnace temperature from zone to zone, or level to level, do occur. Adjustments can be made to the furnace firing controls as often as necessary until the temperature curves merge, as shown in Fig. 5.

Finish Testing Device Simulates Service Conditions

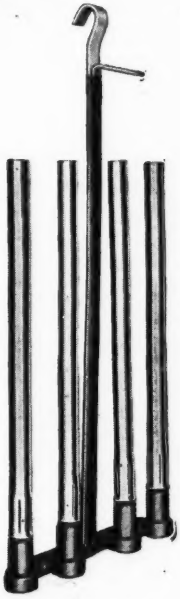
A device known as the Willys-Overland Gravelometer developed by John G. Piceu performs comparative tests of the abrasion resistance, adhesion, flexibility, and hardness of protective organic coatings in a manner which simulates service conditions. The machine, as illustrated in Fig. 1,

Fig. 5—A set of temperature gradient curves obtained from the same furnace as the curve shown in Fig. 4 after the furnace firing mechanism was adjusted to equalize furnace temperature at various furnace levels.



Single Dip

Costs Less



Lasts Longer

. . . BUNATOL No. 1000 Paste insulation saves time and labor because it requires only a single dip coat and a short oven bake. The resulting rack insulation is extremely tough and resistant to all plating solutions and cleaners. Racks will operate for months without breakdown, and without drag out or carry over. First cost is less and final cost-per-hour very low. There are no rack insulation problems when you use BUNATOL No. 1000 Paste. Write for complete information.

NELSON J. QUINN COMPANY, Toledo 7, Ohio

BUNATOL

Fig. 1 — Illustration shows Willys-Overland Gravelometer and two coated panels which have been tested.
(Photo courtesy Willys-Overland Motors, Inc., Toledo 1, Ohio)

is essentially a closed cabinet into which compressed air is admitted underneath a container full of stone pebbles each approximately ¼ inch in diameter and weighing approximately 4 ounces. The air dashes the pebbles against a coated test panel.

Tests are run on a 6 x 12-inch steel panel which has been prepared in accordance with approved production procedure. After the panel has been coated properly, it is aged overnight in a convection oven at 140 deg. F., or one to two weeks at room temperature. The test is made by inserting the test panel in an opening opposite the air inlet and permitting air at a pressure of 20 p.s.i. to blast the stone pebbles against the lower half of the test panel covered with the protective coating being tested. The time required to complete a test ranges from 5 seconds to 15 minutes. When the test is completed, the panel is removed and examined for chipping and erosion of the protective coating. Comparison can be made with the original finish on the unexposed half of the panel.

Tests have been run on wheel enamels, body enamels, primers, and sound deadeners. In Fig. 1 is shown a view of the machine and two panels coated with sound deadener. The lower half of each panel was exposed for 15 minutes to flying gravel at 20 p.s.i. air pressure. The panel in the background shows practically no wear while the deadener on the panel in the foreground shows severe erosion. Similarly, Fig. 2 indicates that the sound deadener on the left possesses less abrasion resistance than the one on the right.

Figure 3 is a view of three panels tested to determine the appearance of various finishes over primed and unprimed steel after 10 seconds' exposure in the Gravelometer at 20 p.s.i. air pressure. The left half of panel No. 1 was sprayed with red oxide semi-gloss non-sanding primer and baked 20 minutes at 325 deg. F. This was followed by a double coat of automotive body enamel over both the primed and unprimed areas and a 20-minute bake at 250 deg. F. Panel No. 2 was primed over the left half with gray sanding primer and baked 20 minutes at 325 deg. F. A double coat of wheel enamel was then applied overall and the panel was baked 7 minutes at 325 deg. F.

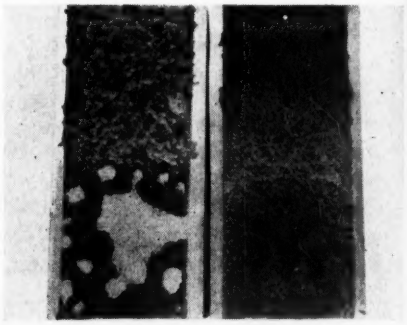


Fig. 2 — A close-up view of tested panels coated with sound deadening material
(Photo courtesy Willys-Overland Motors, Inc., Toledo 1, Ohio)

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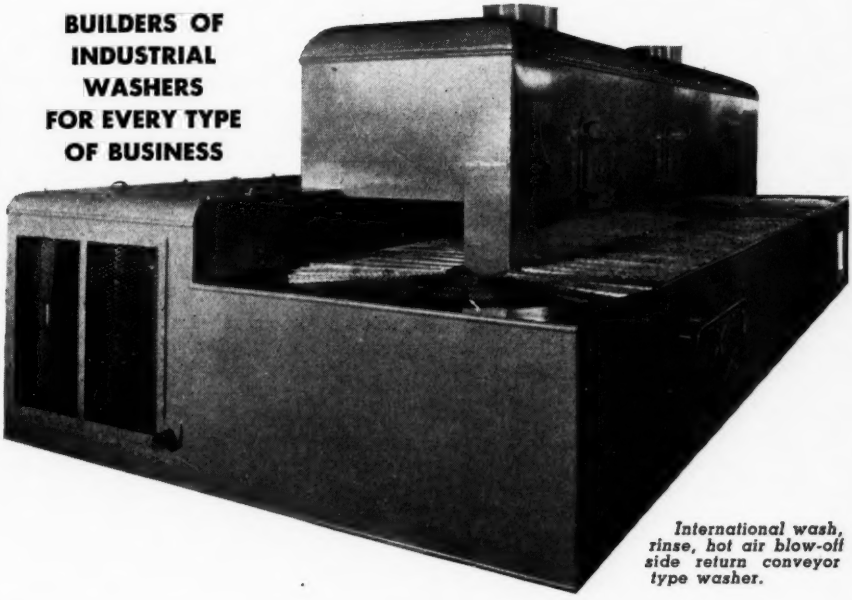

International wash, rinse, hot air blow-off side return conveyor type washer.

● Here's another example of International expert design and excellent construction—a side return conveyor type washer for small parts contained in baskets. It washes, rinses and employs hot air blow-off. It is steam heated and operated by one man.

Put your large and small parts metal cleaning and washing problems up to our engineers. Their long experience in efficiently designing equipment for scores of industries insures the installation in your plant of dependable and profitable production units.

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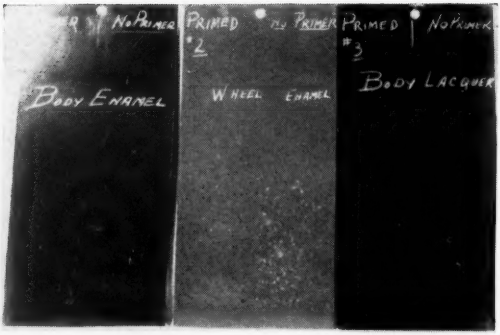


Fig. 3 — A view of tested panels used in determining the value of a prime coat when used with various finishing materials
(*Photo courtesy Willys - Overland Motors, Inc., Toledo 1, Ohio*)

Panel No. 3 was coated over the left half with red oxide primer and baked 20 minutes at 325 deg. F. Black body lacquer was sprayed overall and air dried. Tests on the Gravelometer have indicated that the effect of primer is very beneficial to the adhesion of both lacquers and wheel enamels. Body enamels have resistance to impingement about equal to primers, it was found.

No exact data are yet available which would directly compare, for instance, Gravelometer exposure time to driving time on gravel roads. There are many variables involved in road tests, such as speed of travel, type of gravel road, time of year, and so on, which cannot be accurately duplicated. The Gravelometer, on the other hand, provides valuable data on certain properties of surface finishes from which accurate conclusions can be drawn.

Increased Use of Rhodium Plating

INTERNATIONAL Nickel's exhibit at the recent Industrial Finishing Exposition at Atlantic City included a diversified collection of end products finished in rhodium. Classified as a "platinum-group" metal, rhodium possesses greater whiteness and reflectivity than its more abundant and known sister metals, platinum and palladium.

Since rhodium is chemically inert, extremely hard and heat-resistant, it is an ideal metal for surface finishing. Although rare and costly, the simplicity of plating operations, plus its ability to do the job with a remarkably thin deposit, brings unit costs into reasonable ranges.

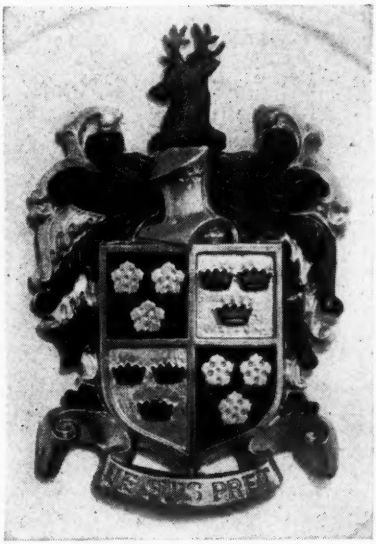
Heretofore confined to jewelry, instrument reflectors and electronic applications, it is evident that rhodium plating has entered new fields affecting our health, punctuality, entertainment, relaxation, investments, appearance and prestige. Included in the exhibit was a hearing aid with a rhodium-plated aluminum case by Sonotone, Elmsford, New York; rhodium-plated watch movement parts, Hamilton Watch Company's method of combating condensation by changes in temperature and humidity; electroformed nickel reflectors with rhodium finish produced by Bart Laboratories, Inc., Belleville, New Jersey, for home motion picture and slide projectors; Alfred Dunhill's beautiful Rollalite cigarette lighters and the new automatic lighter produced by American Safety Razor Company, Brooklyn, New York — all rhodium-plated for wear and tarnish resistance. Gillette Safety Razor's new "Aristocrat" model was on display — rhodium finished for corrosion and wear resistance. A white-gold filled expansion watch bracelet by Finesse Wristlet, Inc., New York, was shown — rhodium-plating furnished a hard brilliant finish. A mirror with a rhodium reflective surface on the front of the glass—to eliminate

HOW TO CUT THE COST OF SPRAYING SUNKEN OR RAISED AREAS OF METAL OR PLASTIC PARTS

One color right after another can be wet painted before baking, on many concave, convex or irregularly shaped three-dimensional parts, with

ELECTRO-FORMED METAL MASKING TEMPLATES

Clean, sharply defined letters and effects are obtained on intricately designed emblems, nameplates, automobile and radio dials, hub caps, horn buttons, and household appliance utility markings.



NO FOGGING, AFTER-WIPING, BUFFING

A thin, yet strong, lip of metal which fits accurately into the edge of the debossed areas eliminates fogging at the edge of the paint line, and avoids after-wiping or buffing off of overspray.

PERFECT CHARACTERS WITHOUT "TIES"

By special arched bridging, the "loose" inside of letters and numerals, such as "0" and "6," are held in position to effect perfect characters without the use of the objectionable "ties" necessary with common stencils.

FAST PRODUCTION

Can be fitted to fixtures on production lines. Used on hundreds of nationally known products.

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I am interested in your metal masking shields. Please send without obligation:

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This bright nickel process produces brilliant, lustrous, adherent nickel deposits that may be chromium plated. Merely add LUSTREBRIGHT to your present cold or lukewarm nickel solution. Work comes from plating tanks or mechanical barrels bright and shiny. No special solution or change in equipment necessary. Write for information.

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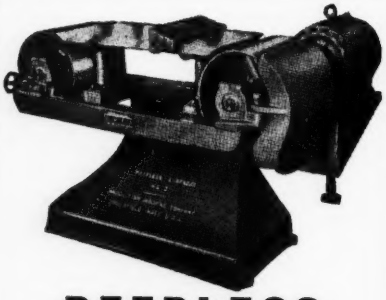

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For speed and quality in grinding flat surfaces of metal, wood, hard rubber, celluloid and plastics. Furnished in 9", 14", and 20" sizes.

Other Horizontal and Vertical types for flat or round work can be furnished.

Production
MACHINE COMPANY GREENFIELD, MASSACHUSETTS, U.S.A.

double image and refraction errors—and rhodium-plated copper wire for "catwhisker" contacts in electronic hookups were shown—these produced by Sigmund Cohn Mfg. Co., New York.

A large glass platter beautifully decorated with sterling silver and rhodium-plated to prevent tarnishing was exhibited—manufactured by National Silver Deposit Ware Co., New York. Heavy sterling silver identification bracelets were included—rhodium-plated to resist tarnishing by Milglo Jewelry Co. of New York. A fingernail clipper and a rhodium-plated razor case by Wilkinson Sword Razor Co. of New York, were on display—the case being an example of de luxe packaging. A wide variety of ladies' costume jewelry and men's accessories in rhodium-plated sterling silver created by Forstner Chain Co., Irvington, New Jersey, rounded out the interesting exhibit.

The platinum group metals—platinum, palladium, rhodium, ruthenium and iridium — are recovered as by-products during nickel and copper refining operations of The International Nickel Company of Canada, Limited. Hundreds of tons of Canadian ore are processed to extract a single ounce of these rare metals.

The paints with which most of us are familiar, reflect light, and the color of the paint is determined by the portion of the light spectrum that the paint reflects. Paints that emit light—that is, glow in the dark—are relative newcomers. These absorb light somewhat like a storage battery, and then expend it in the dark. They are called "luminous" paints and are used to paint wall switchplates, stairs and bannisters, clock dials, fish lures and floats, telephones and other points so that these can be found quickly in total darkness. Many accidents or minor injuries are thus prevented.

NEWS of the Industry

NEW PLANTS

The Mixing Equipment Co., 1024 Garson Ave., Rochester, N. Y., has recently installed its entire manufacturing operation in a modern new plant located on the outskirts of the city. The new plant is a one-story structure designed for maximum efficiency in material flow, fabrication, and assembly.

Ideal working conditions are ensured by installation of fluorescent lighting fixtures throughout. In addition, natural light is admitted through the walls which are constructed entirely of glass. Workers are provided with the most modern washrooms and showers.

Material handling is speeded by overhead traveling cranes in all bays and by the use of electric lift trucks. Power is quickly available at any point in the plant through the use of bus bar wiring.

The former plant will be used exclusively for research and engineering. The company has pioneered in the field of mixing and agitation equipment development and research, and plans to place even more emphasis than before on this phase of its operations. Edwin L. Lowthian has recently joined the firm as senior process engineer.

All Charlotte district sales offices of the **Du Pont Company** have been consolidated in a building erected for them at 427 Fourth Street, Charlotte, North Carolina.

The structure, two stories and a pent house used as a laboratory, is brick, fully air conditioned, and newly equipped and furnished to serve Charlotte region customers of four of Du Pont's ten operating departments—Organic Chemicals, Rayon, Grasselli Chemicals, and Electrochemicals.

The entire first floor has been assigned to the Rayon department, and is the headquarters of Davis L. Lewis, Jr., district sales manager of the Rayon division; James J. Cook, of the Acetate division; and David B. Hardin, of the Nylon division; and their staffs. The district sales offices of the Organic Chemicals, Electrochemicals, and Grasselli Chemicals departments have been assigned to the second floor, which includes the offices of D. C. Newman, Southern sales manager, and Robert Sloan, Charlotte district manager of Organic Chemicals; L. R. Kennette, Charlotte district sales manager for Electrochemicals; and Henry F. Koll, Charlotte district sales manager for Grasselli. The pent house is occupied by the district dyestuff service laboratory for Organic Chemicals.

The Flock Process Co., Inc., and its affiliated companies, Coated Fabrics Corporation and Velvetone Fibers Corporation, have moved to larger quarters at 365 Main Street, Norwalk, Connecticut.

The new plant, which contains 85,000 square feet of factory space and a railroad siding, is equipped with the latest type of equipment for all methods of flock coating on cloth, paper, plastics, metals and wood, and metal finishing.

A new research center located at Brecksville, Ohio was inaugurated on June 15 by **The B. F. Goodrich Co.**, Akron, Ohio. The main building is a three-story structure containing 81 individual laboratories, a cafeteria, assembly hall, and a 10,000-volume library.

In addition to probing into the mysteries of crude and man-made rubber, the center will conduct intensive research in such fields as chemicals, plastics, agriculture, horticulture, and the application of nuclear energy to rubber manufacturing. Atomic energy's usefullness and effects in rubber and related materials will be studied in one of the laboratories.

The office and laboratory of **Technical Specialties Co.**, Malden, Mass., have been moved to Wilmington, Delaware. Mr. T. L. Hines, former general manager of the "Cellophane" Division of the Du Pont Company, is now president and general manager of Technical Specialties Company. Dr. William E. Decker remains as technical director. The development and manufacture of pearl essence and Dekadhese, a technical adhesive, will be continued.

McCook, Illinois has been chosen as the site of the new, modern plant of **Turco Products, Inc.**, manufacturer of specialized industrial cleaning compounds. The new plant is a necessary addition to Turco's present manufacturing facilities at Chicago, Los Angeles, and Houston.

Many factors combine to make McCook an ideal location. Its availability to various sources of raw materials and its central location for distribution of finished compounds makes possible more rapid service and equalization of freight charges to Midwest and Eastern markets.

The Link-Belt Company announces that it has contracted for the construction of a modern new plant in Houston, Texas.

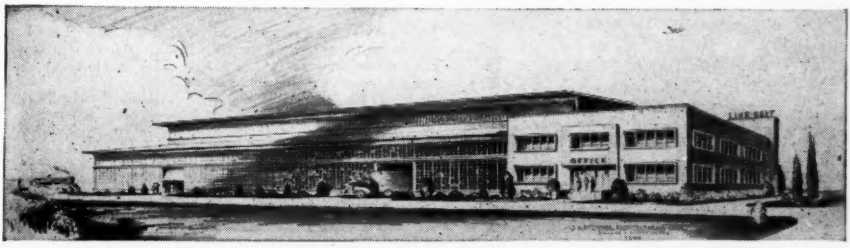
Included in the project will be a one-story, all steel factory building with three bays, and a two-story office section of masonry construction in front. The plant proper will include a modern machine shop, structural steel shop, and large warehousing facilities. This new plant, comprising approximately 45,000 square feet of floor space, is being built to better serve the ever expanding industries of the Great Southwest, either direct or through the company's factory branch stores and official distributors.

The Arco Co., Cleveland, Ohio, lacquer manufacturer, has resumed production of lacquer in a plant composed of five insulated Quonset type buildings, replacing the lacquer plant destroyed by fire March 5. Construction of the new $200,000 plant was started March 29 with the pouring of a 4-foot concrete wall for the main manufacturing building and completed July 15 with the installation of a 4,000-lb. hydraulic elevator.

Howard E. Wise, Arco president, credits the prompt completion of the plant to the cooperation of equipment manufacturers and some of their customers who waived prior claims on certain equipment.

A new multi-million dollar chemical plant for the manufacture of silicone materials has been completed at Waterford, New York, by the Chemical Department of the **General Electric Company**, according to an announcement by Harry K. Collins, manager of the Resin and Insulation Materials Division. Consisting of six buildings and a chemical tank farm located on a 15-acre plot, the Waterford plant currently employs approximately 150 persons.

Derived from sand and processed by a completely new form of chemistry, silicone materials are noted for their ability to withstand a wide range of temperatures from approximately 70 degrees F. below zero to 520 degrees F. above, a feature which makes them particularly applicable for various types of equipment used by the Armed Services in all temperature zones. Today the materials are



New plant to be built by Link-Belt Company in Houston, Texas

being applied in as widely diversified products as Diesel engines and fishermen's dri-flies.

The Glidden Company has purchased 50 acres of land at Macon, Georgia, and plans to build three factories there at an investment of several million dollars, according to Adrian D. Joyce, Glidden board chairman. This will bring to 34 the number of factories the Cleveland-based company operates in the multi-million dollar manufacture and sale of paints, varnishes, lacquers, foods, and scores of other diversified products.

COMPANIES

Daniels Plating Barrel and Supply Co., 129 Oliver St., Newark 5, N. J., announces expanded facilities for the manufacture and sale of Daniels plating barrels and buffing compositions. Additional warehousing space for the stocking of a complete line of electroplating and polishing equipment and supplies has been added. To accompany increased production facilities, the engineering staff has been enlarged so that new products for the electroplating and polishing fields may be developed.

Griffin & Co., Inc., Louisville, Ky., has been licensed to build and market the self-cleaning filtering dust collector and improvements thereon as developed by H. J. Hersey, Jr., Empire State Bldg., New York. Prominent during the war as fabricators of ventilating equipment for the LST boats built on the Ohio River, Griffin & Company, Inc., has since specialized in dust collecting equipment for the larger industries in that area and this month is moving into a new plant at 500 Bergman Avenue, Louisville.

Some years ago, **Rolock Inc.,** Fairfield, Conn., adopted the name of Processing Carriers for its line of industrial baskets, trays, racks, crates, fixtures, sinks, and so on, custom-built for heat treating and metal finishing uses.

With the development of modern heat and corrosion resistant alloys and new fabricating and welding techniques the market has expanded, and demand is being met for fabricated alloy construction of job-engineered retorts, muffles, baskets, and other types of equipment which cannot be properly designated as carriers. The term, "Fabricated Alloys," has now been adopted to designate the Rolock line of products.

Ready for operation at the plant of Lustron Corporation, fabricator of porcelain enameled steel houses, is the half million dollars' worth of enameling and finishing equipment installed by the **Despatch Oven Co.,** Minneapolis, Minn. The equipment ranges from low temperature cover and ground coat driers and enamel spray booths to a complete organic finishing system, including five-stage metal preparation, spray booths, and finish baking equipment.

The following items of equipment have been installed by the Despatch Company: enameling plant equipment—7 ground coat drying ovens, overhead monorail, sizes up to 16 x 50 x 13 feet; 3 cover coat drying ovens, overhead monorail, sizes up to 14 x 31 x 12 feet; 10 cover coat drying ovens, tunnel type, pin conveyor, open flame burners, sizes up to 6 x 80 x 5 feet; 3 cover coat spray booths,

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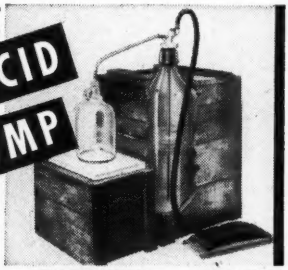

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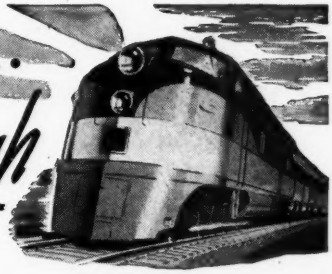
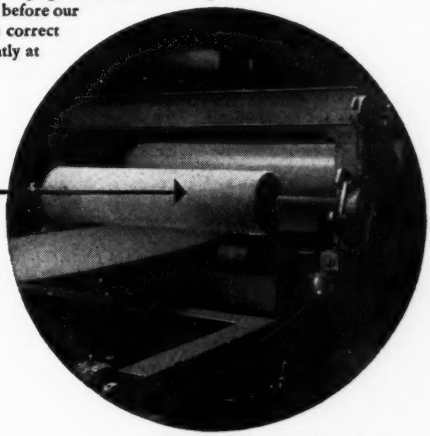


HERE'S WHAT HAPPENED:—Today's streamlined trains need big tonnages of high finished metal. One of the nation's leading strip producers ran into trouble with his brushes—brushes which burnish strip rolling, under high pressure, at 40 miles per hour Like many other industrialists, he put his problems before our skilled brush engineers. Pittsburgh selected the correct perfect balanced brush that would work efficiently at the required speed.



This is the Pittsburgh brush that did the job!

The brush had to be stiff enough and tough enough to resist abrasion; yet soft enough to improve the surface texture. Thus another industrial brush problem was solved by Pittsburgh! You too, can always depend on Pittsburgh to solve your brush problems. The efficiency and performance of Pittsburgh Power-Driven Brushes are tested and proved day after day by strip producers all over the country.

There's a Brush by Pittsburgh for *Every* Industrial Use—

GLASS	AUTOMOBILE	TIRE & RETREADING
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PLASTICS	PAPER	& REPAIRING

In the complete Pittsburgh line are brushes of all types, including "Perfect Balance" sections, wheels and assemblies. Uni-fill scratch brushes as well as paint and other maintenance brushes. Consult the Pittsburgh engineering representative. He will gladly work with you in developing any type of power-driven brushes to meet your particular finishing specifications.

Use only Power-Driven Brushes By Pittsburgh—it pays

You can depend on Brushes by Pittsburgh to meet your particular finishing requirements. Perfect balance, top performance, enduring economy and a minimum of lost time in changeovers–Pittsburgh Power-Driven Brushes are specifically engineered to do your job right.

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Steel rule and depth gauge, 6", complete with pocket clip, and attractive leather case. Yours for the asking . . . write Pittsburgh Plate Glass Company, Dept W-5, Baltimore 29, Md.

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48 feet wide; 4 reinforcing spray booths; 2 back up spray booths, 56 feet wide; 1 ground coat spray booth, 48 feet wide; finishing system for organic finished cabinets and closets—1 paint drying oven, 22 x 104 x 12 feet; 1 moisture dry-off oven, 10 x 42 x 12 feet; 1 five-stage metal treating system; and 2 staggered water-wash spray booths, 48 feet wide. The equipment here listed was custom-designed by Despatch engineers to synchronize with the overall production requirements of the new Lustron plant.

NEW POSITIONS

American Industrial Chemical Co., Inc., Indianpolis, Ind., announces the appointment of **Wayne H. Conger** as general manager of the paint and enameling division.

Mr. Conger was formerly manager of an industrial finishing plant, and prior to that was in charge of production finishing of Norden Bombsights at the Indianapolis Naval Ordnance Plant. He has also served as finishing foreman at the Radio Corporation of America, Indianapolis, Indiana.

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Originators of paint rejuvenating equipment---sixteen years—thousands of satisfied users.

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E. Harold Shakespeare has been appointed technical advisor in the newly formed Regolac Division of Titanine, Inc., Union, N. J., producer of aircraft finishing materials.

Mr. Shakespeare was formerly with Flood & Conklin for 26 years and is a graduate of Mt. Herman Preparatory College and the Newark College of Engineering. He is chairman of the Technical Training Committee of the New York Paint, Varnish and Lacquer Association.

Arthur L. Perkins, 5C River Park Apartments, White Plains, N. Y., is the newly appointed Eastern representative of Hammond Machinery Builders, Inc., Kalamazoo 54F, Mich. Mr. Perkins brings to his new position a sound technical background, practical knowledge, and production experience in metal finishing. He is well known throughout the Eastern Seaboard metal finishing industry.

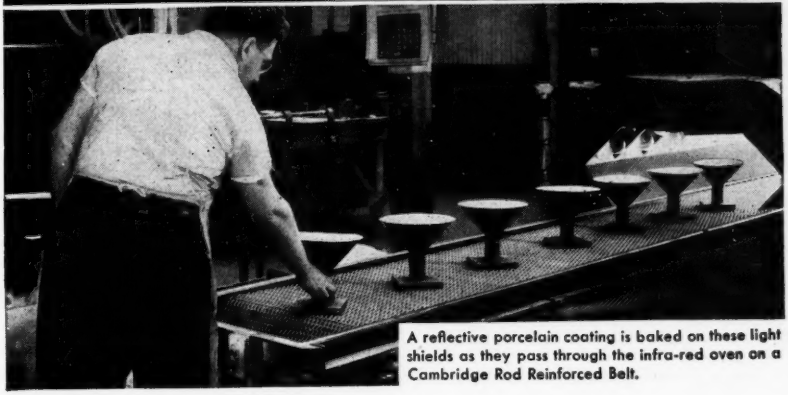
Fred C. Pfeiffer, president of **Strathmore Products, Inc.,** 1970 W. Fayette St., Syracuse, N. Y., announces the purchase of Unifilm Paint Co., 100 Cornell Blvd., Somerville, N. J. The purchase was made to expand Strathmore's facilities for serving Metropolitan New York, New Jersey, and adjacent states with its complete line of industrial finishes.

To broaden the scope of the company's services to its customers in industries using synthetic resins, the Hercules Powder Company has announced two transfers affecting personnel in its Synthetics Department. **Paul L. Lefebvre,** who has been district manager for synthetics in the Hercules Chicago office, has been transferred to the company's home office in Wilmington, where he now is assistant manager of the department's Market Development Division. **J. Glenn Little,** formerly assistant manager of the Market Development Division, has taken up his new duties in the Chicago office, replacing Mr. Lefebvre.

Mr. Lefebvre joined Hercules immediately following his graduation from Dartmouth in 1938. He has served on the Hercules sales staff in Buffalo and Chicago and was appointed district manager in Chicago in February 1944.

Mr. Little has been associated with Hercules for 16 years. He holds degrees from Baylor University and Oklahoma A. and M.

When Production Depends on Product Movement—



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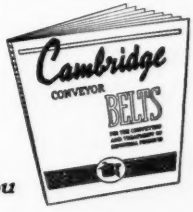

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Leonard R. Lindsey has been appointed service engineer for the Metal Industries department of The Diversey Corporation. Lindsey will handle the sales and servicing of Diversey metal cleaning and surface preparation products in the Columbus-Dayton-Cincinnati area.

Sun Chemical Corporation has announced the appointment of **Dr. Wilber Otis Teeters** as director of research to succeed Dr. Paul V. McKinney, who resigned from the Corporation.

In February 1946, Dr. Teeters joined Sun Chemical as principal research chemist. The following January he was assigned the additional responsibility for supervision of Sun's research laboratory in Harrison, New Jersey.

A. H. Losey, who recently joined the Frederic B. Stevens organization, has been named manager of the Cleveland office, 1940 E. Sixth St., Cleveland, Ohio.

Mr. Losey has spent 23 years in the electroplating and metal finishing industry. He was formerly employed in a supervisory capacity by both the National Brass Company and Winters & Crampton, Grand Rapids, Mich. Later on, he joined J. C. Miller Co., Grand Rapids, as sales engineer, and was subsequently associated with Hammond Machinery Builders, Kalamazoo, Mich., in the same capacity.

Just prior to his affiliation with Stevens, he owned and operated the Kenart Manufacturing Co., Kalamazoo. Michigan.

The industry in Cleveland and the immediate north central section of Ohio can profit from Mr. Losey's long and varied experience with plating and finishing problems.

The Du Pont Company has announced the appointment of **Frederic A. C. Wardenburg,** manager of its European office in London, as director of sales of the Pigments Department in Wilmington, Delaware. He succeeds Dr. D. H. Dawson whose promotion from director of sales to assistant general manager was recently announced.

Mr. Wardenburg has been with Du Pont for 20 years, starting with the company soon after he received a bachelor of science degree in mechanical engineering from Princeton University.

The Egyptian Lacquer Manufacturing Co., South Kearney, N. J., has announced the appointment of **Lawrence R. Gardner** as purchasing agent, replacing E. B. Bradshaw, who was promoted.

Mr. Gardner was formerly purchasing agent at the High Point, North Carolina plant of the American-Marietta Company. Prior to that he was associated with the Monsanto Chemical Co., Everett, Massachusetts.

Magnuson Products Corp., 50 Court St., Brooklyn 2, N. Y., has announced the addition of **Mort Inglis** to its sales staff representing the corporation in San Francisco and Oakland, California.

Mr. Inglis, through his experience as a consumer of industrial cleaning compounds, his long experience in the sales and service of these compounds, and by his friendly attitude, is well qualified to assist consumers in the selection and use of the proper materials for their requirements. He will have available to him expanded warehouse facilities to facilitate prompt service to customers.

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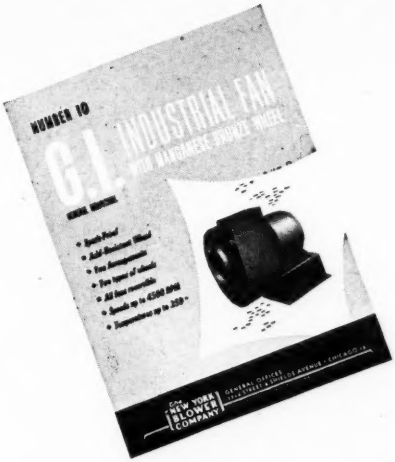

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FACTORIES at LA PORTE, IND. and CHICAGO, ILL.

Appointment of **H. A. Hoppe** as assistant general sales manager of Claronex Products, Inc., Brooklyn 22, N. Y., manufacturer of Phenolex and Zinkromex, has been announced by Ronald R. Fay, president and general manager.

Mr. Hoppe comes to Claronex Products, Inc., after more than 21 years' service with one of the large national paint manufacturers. In his new capacity, Mr. Hoppe will supervise the sales and distribution of the company's new line of protective and decorative coatings.

The Standard Varnish Works (Trade Sales Division) and its subsidiary, Toch Brothers, Inc. ("R.I.W.") of New York and Chicago, have announced the appointment of **Leon D. Eldot** as coordinator of marketing and sales development for both companies. He will be associated in these activities with W. M. Seidel, manager of the Eastern division, and L. H. Jenkins, manager of the Western division.

Mr. Eldot was formerly associated with L. Sonneborn Sons, Inc., as manager of its building products and paint division; is a past president of the New York Paint, Varnish & Lacquer Association, and is now on the president's advisory commitee. He is a member of the Advertising Club of New York City, Sales Executives Club, National Federation of Sales Executives, American Marketing Association, and American Arbitration Association.

The affiliation of **Howard G. Pańkratz**, industrial engineer, with The R. C. Mahon Company has been announced by W. F. Sheetz, vice president of the company. Mr. Pankratz, a graduate of M.I.T., has had broad experience in the industrial engineering field, and more recently has served as consulting engineer on industrial equipment matters. He will join the sales-engineering-consultant staff of the Industrial Equipment Division of the company—a division specializing in planning, engineering, building, and installing complete conveyorized finishing systems for the application of synthetic and porcelain enamel, lacquer, paint, and varnish. These complete finishing systems include metal cleaning and rustproofing equipment, dry-off ovens, hydro-filter spray booths, filtered air supply systems for pressurized spraying enclosures, drying and baking ovens, and paint reclamation systems.

Paul Queneau has been appointed metallurgical engineer of The International Nickel Company of Canada, Limited, and subsidiaries, it was announced by Robert C. Stanley, chairman and president of the company.

Mr. Queneau has been superintendent of research at International Nickel's mines and plants at Copper Cliff, Ontario, since May 1941. In his new position his headquarters will be at New York. Joining the company in 1934, Mr. Queneau was a member of the technical staff of the company's Huntington, West Virginia works for three years. He was then transferred to Copper Cliff, where he was research engineer until his appointment as superintendent of research in 1941.

Mr. Queneau is a graduate of the Columbia School of Mines, where he received B.A., B.Sc., and E.M. degrees. He studied at Cambridge University, England, as an Evans Fellow. Mr. Queneau is a member of the American Institute of Mining and Metallurgical Engineers, the Canadian Institute of Mining and Metallurgy, the Artic Institute of North America, and the New Jersey Society of Professional Engineers.

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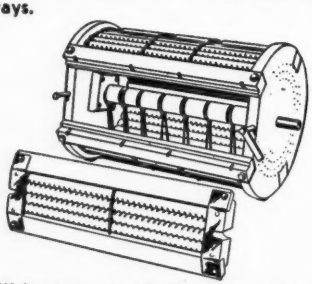

Write today for further information.

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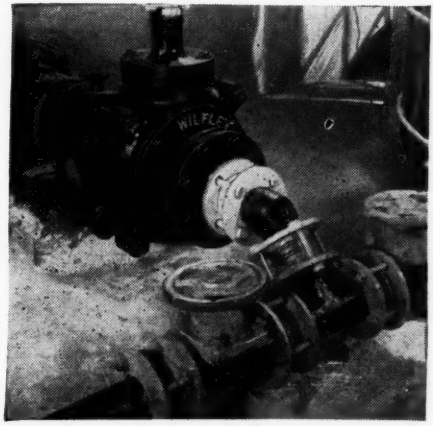

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HONORS

The American Society for Metals has announced that **Willard H. Dow** has been elected to receive the Society's Medal for the Advancement of Research for 1948. Dr. Dow is president of the Dow Chemical Co., Midland, Michigan.

Qualifications for the candidate who receives this award have been outlined by W. H. Eiseman, national secretary of ASM, who stated that "the candidate shall be an executive in an industrial organization, the principal activity of which is the production or the fabrication of metals. He shall be one who, over a period of years, has consistently sponsored metallurgical research or development and, by his foresight and his influence in making available financial support, has helped substantially to advance the arts and sciences related to metals."

Presentation of the model, plaque, and citation will be made at the annual banquet of the American Society for Metals to be held in Philadelphia on October 28 during the National Metal Congress and Exposition.

SOCIETIES

Samuel S. Johnston, technical director of the Electrolytic Department, Weirton Steel Co., Weirton, W. Va., was elected president of the American Electroplaters' Society during its recent 35th Annual Convention in Atlantic City, New Jersey. Mr. Johnston has been active in the society for a number of years, and has previously held the positions of first and second vice president. A graduate of the College of Engineering, Ohio State University, Mr. Johnston was associated with the Carnegie Steel Company and the U. S. Bureau of Mines prior to his present connection.

Arthur W. Logozzo of Hartford, Connecticut, was elected to the position of first vice president. Mr. Logozzo is president of the Nutmeg Chrome Corporation in Hartford.

Elected to the position of second vice president was **William J. Neill**, general superintendent of the Columbus Metal Products Company, manufacturer of oil burner and truck and bus equipment.

C. F. Nixon of Detroit, Michigan, was elected third vice president of the society. Mr. Nixon is director of process engineering at the Fisher Body-Ternstedt Division, General Motors Corp.

A. Kenneth Graham was again named by the executive board of the society to hold the position of executive secretary, which he has held since 1945. Dr. Graham is the president of Graham, Crowley & Associates, Inc.

TRAINING COURSES

The Ohio Mechanics Institute, Central Parkway and Walnut St., Cincinnati, Ohio, is offering an evening course in electroplating. Subjects to be considered in the course include: principles of electroplating, cleaning methods, copper, nickel, chromium, cadmium, tin, zinc, and silver plating. Each solution studied will be discussed in the classroom and methods of analysis and control will be considered in the laboratory.

The Foxboro Company, which has conducted training courses in the theory, application, operation, and maintenance of industrial instruments since 1935, has

WOOD TANKS for
Plating and Pickling

Excellent Service on all types of wood tanks for any purpose. Built to your specifications by one of America's oldest tank specialists.

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You can produce on any material the following surface finishes:

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Used in the auto, airplane, radio, electrical, phonograph, ceramics, furniture and many other industries for surfacing all sorts of materials to provide

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Applied in various lengths and colors to wood, paper, cloth, metal, etc., the following effects are produced—

FURNITURE UPHOLSTERY • SUEDE LEATHER • INTERIOR AND DRAPERY FABRICS • VELVET • VELOUR • MOHAIR • CARPET

with these patented and trademarked Rayco specialties:

FELT AND SUEDE SURFACE

*"Raymix"—a flock of rayon fibres, trademarked under U. S. No. 427949 to produce a suede effect of utmost realism on any surface.

*"Kingcote"—a cotton flock trademarked under U. S. No. 423572, producing a suede effect at minimum cost.

MOHAIR, VELOUR AND VELVET SURFACE

"Raycote"—a flock composed of uniformly cut rayon fibres to produce on any surface a pile effect such as velvet, plush, or velour. Made under U. S. Patent No. 2014947.

SYNTHETIC CARPET

"Harecote"—a flock composed of animal fibres, produces a durable carpet or rug material.

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3901 Main St.
Dallas, Texas

announced its schedule for the remainder of 1948. There will be five courses, each of two weeks' duration, in the months of July, August, October, November, and December. Courses will also be arranged for companies wishing to send a group sufficiently large to warrant a special class for the study of particular instruments and applications. Special courses will also be arranged for specific industry groups. Similar facilities are offered by The Foxboro Company Limited, Montreal, Canada.

For information, address the Director of Training Courses, The Foxboro Co., Foxboro, Massachusetts.

MEETINGS

The Fall Meeting of the **Chicago District Enamelers Club** will take place on September 25 at the LaSalle Hotel, Chicago, according to an announcement by G. W. Hofstetter, president of the club. The meeting will consist of a noon luncheon followed by an educational program of interest and benefit to the membership.

Officers of the Chicago District Enamelers Club for the current year are vice president, George Tuttle, Benjamin Electric Company; secretary & treasurer, Edwin Bolin, Chicago Vitreous Enamel Products Company; and assistant secretary & treasurer, Fred Petersen, Ceramic Dept., University of Illinois. Committee chairmen are: membership, M. B. Gibbs, American Stove Company; program, Forrest Nelson, A. O. Smith Corporation; and publicity and education, Rudyard Porter, Carnegie-Illinois Steel Corp.

CUT DOWN REJECTS
WITH
ORVUS
IN YOUR METAL CLEANING BATHS

You'll find this synthetic detergent effective
—as a wetting agent
—as an emulsifier
—in dispersing lime soaps which might cause poor plating if allowed to deposit on the metal
—in speeding rinsing — minimizing water marks

Write for further information about Orvus to

PROCTER & GAMBLE • Cincinnati 2, Ohio

NECROLOGY

Fred J. Henning, field sales representative of the Philadelphia Quartz Co., Philadelphia, Pa., died July 9 at Oak Park, Illinois, after a brief illness. Prior to his association with the Philadelphia Quartz Company, he had been a chemical engineer with Westinghouse Lamp Co., Bloomfield, N. J., and Western Electric Co., Chicago, Illinois.

Mr. Henning joined the Philadelphia Quartz Campany in 1930 as a sales representative. One of his initial assignments was the introduction of Metso sodium metasilicate in the Midwest territory. He also contributed to technical literature covering the use of metasilicate and other silicates in industry.

Dr. J. K. Moore, supervisor in the cellulose products division of the Hercules Powder Company Experiment Station, Wilmington, Del., died July 13. He was Delaware's first polio fatality in 1948.

Born in DuBois, Pennsylvania, Dr. Moore spent his boyhood in Detroit, Michigan. He graduated from the University of Michigan in 1937 with a B.S. degree and honors in chemistry. In June 1941, he received his Ph.D. degree from Western Reserve University, Cleveland, Ohio.

After working with the Westvaco Chlorine Products Corp. in Charlestown, W. Va., Dr. Moore joined Hercules in September 1941, as a research chemist in the general research laboratories of the experiment station. After a few months he was assigned to the cellulose products division where he remained until May 1945. At that time he was appointed assistant group leader in general research. He returned to cellulose products in January 1948, as a supervisor.

He was a member of the American Chemical Society, Alpha Chi Sigma, and Sigma Xi.

SOL-KLEAN

Phosphoric Acid Metal Conditioner

PREPARES METAL FOR PAINTING

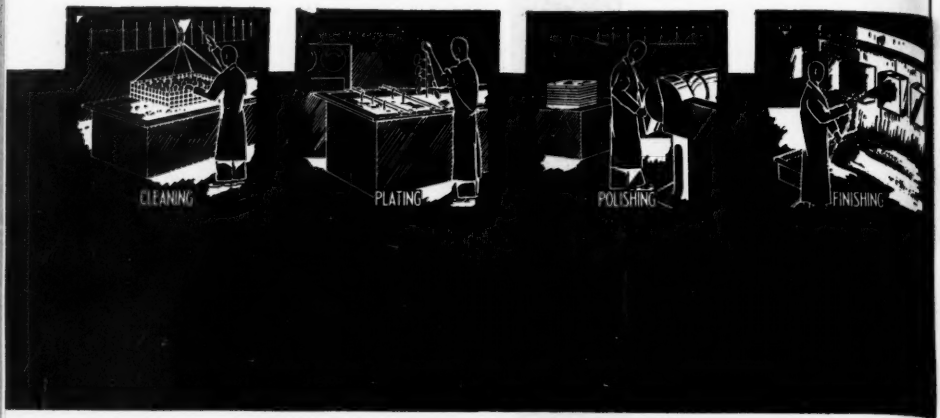
- *CLEANS METAL—Removes oil, rust and corrosive agents.*
- *BONDS PAINT—Etches metal and coats with phosphate.*
- *SAFE — Non-inflammable, non-toxic, non-corrosive.*
- *EASILY USED — Liquid applied by brush or dipping; wiped or washed off.*
- *APPROVED—Over 3,000,000 gallons used in last 10 years.*
- *ECONOMICAL — Dilute one volume Sol-Klean with three volumes of water.*

INDUSTRIAL CHEMICAL PRODUCTS CO.

3779 Bellevue Ave.,

DETROIT 7, MICHIGAN

In Canada made and sold by Boyle Chemicals Limited, Windsor, Ontario.



Magnus "Krazy-Dip" Cleaning Machine

Product of the Equipment Division, Magnus Chemical Co., Inc., Garwood, N. J., the Magnus "Krazy-Dip" Cleaning Machine shown herewith is designed for the washing of metal parts in automotive and aircraft shops, service stations, shipyard repair shops, railroad repair shops, and metal-working plants. The machine is fully automatic in operation, the only manual labor required being that of loading and unloading.

A cold cleaning machine that requires no heating, the Krazy-Dip is said to clean unusually fast by providing for mechanical agitation of the parts in the cleaning solution at a rate of 160 times a minute. The turbulently flowing solution is forced into all crevices and hard-to-reach areas, and carbonized oil and dirt are said to be quickly removed and washed to the outside of the parts.

Sturdily built of 14 gauge hot rolled steel sheet and with hinge cover complete with fusible safety link, the Krazy-Dip Cleaning Machine is designed for operation from an air compressor at an air consumption of 1 to 2 cubic feet per minute and a minimum air pressure of 50 pounds per square inch.

Magnus "Krazy-Dip" Cleaning Machine

FEinc Vacuum Filter

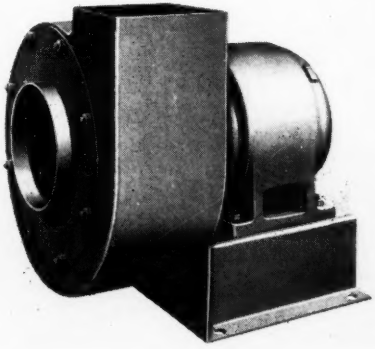
A small, continuous FEinc vacuum filter has been developed by Filtration Engineers Inc., 585 Summer Ave., Newark 5, N. J. Used in conjunction with any waste-acid neutralizing process which results in a suspension of iron oxides and other solids in a neutralized solution, the FEinc continuous filter separates the suspension into easily handled solid cake

and clear filtrate which can be released into streams without danger of acid pollution. The filter is a special adaptation of the FEinc String Discharge Filter that has long been used for filtering commercial iron oxides and various pigments.

Filtering rate of this small model ranges from 60 to 600 lb. of dry solids per hour, depending on the nature of waste liquor and the type of neutralizer used. According to the manufacturer, the filter works equally well on pickle liquor that has been diluted before neutralization and on waste acids that have been used to neutralize waste alkalies before being completely neutralized by the lime or other process. The cake, containing 55 to 75 per cent moisture, is said to be handled easily by conveyor or truck. The FEinc String Discharge Filter may be used also for recovering cakes that have by-products value.

No. 10 G.I. Fan

A general industrial fan provided with a manganese bronze wheel and designated as No. 10, is being supplied by the New York Blower Co., 32nd & Shields Ave., Chicago 16, Illinois.

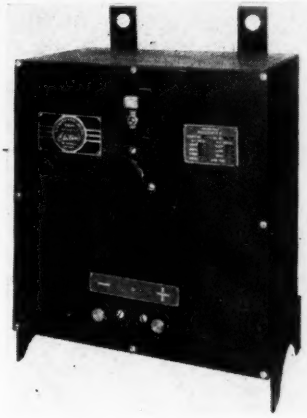


No. 10 G.I. Fan

The manufacturer points out that the wheel of the fan has the advantages of being spark proof and acid resistant. The hazards involved in the handling of explosive air mixtures and corrosive fumes are thus minimized.

Wheels of two different types, the "L. S." type and the "Wool" type, are available. Fans are supplied in varying sizes to meet individual needs.

Electrolytic Purification Rectifier



Electrolytic Purification Rectifier

An electrolytic purification rectifier, designed to provide a source of direct current for solution purification by electrolysis, has been introduced by Richardson-Allen Corporation, 15 W. 20th Street, New York, N. Y., manufacturer of selenium rectifiers. The manufacturer suggests that the rectifier can be used for continuous 24-hour purification of bright nickel, dull nickel, and acid copper plating solutions.

The manufacturer claims that since the rectifier is convection cooled, maintenance is minimized. Stepless controls provide voltages from 0 to 1 volt. Some of the compact models offered are rated at 1 volt—50 amperes, 1 volt—100 amperes, and 1 volt—200 amperes..

Kelite Paint Lift

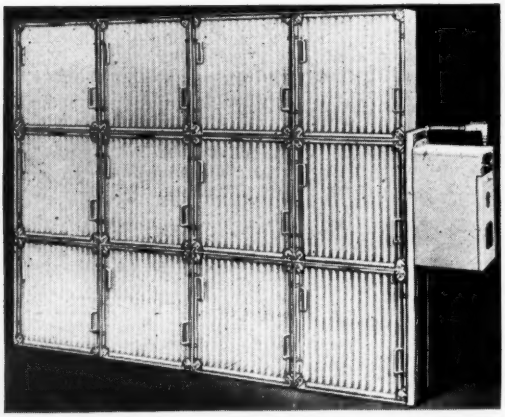
Product of Kelite Products, Inc., Box 2917, Terminal Annex, Los Angeles 54, Calif., improved Kelite Paint Lift is said to penetrate paint more thoroughly and remove paint faster by inhibiting evaporation.

Kelite Paint Lift is claimed to be safe on all metals, including aluminum, iron, tin, magnesium, and so on. It contains no phenolic compounds, cannot blister skin, is non-toxic, non-corrosive, and non-flammable, the manufacturer states.

AAF Electro-PL Electronic Air Filter

Identified as the AAF Electro-PL, an electronic air filter with an intermediate cleaning efficiency has been developed by the American Air Filter Co., Inc., 215 Central Ave., Louisville 8. Ky. The filter is basically an electronic precipitator without an ionizing unit and contains a collector element of electrostatically charged Airmat paper. This paper is a laminated cellulose product composed of a number of plies of porous tissue-like sheets formed of short fibers in "jack-straw" arrangement and is also used as a filtering media in mechanical filters. When an electrostatic charge is applied to the paper, the plies tend to separate and each individual fiber becomes a collecting electrode which attracts and holds dust and smoke particles, removing them from the air stream.

Since the Electro-PL is said to continue to function as an efficient air filter when de-energized, its operation may be varied to suit the dust condition—as an electronic air cleaner during the winter months when a smoky atmosphere is prevalent and as a dry-type air filter during the summer months. Maintenance is said to be simplified since the Airmat paper is replaceable with new material when it has accumulated its full dust load.



AAF Electro-PL Electronic Air Filter (Straight Bank Arrangement Size)

Calgon Metal Cleaners

Two new metal cleaners said to be effective individually or in combination for cleaning a wide variety of metals and alloys, have been announced by Calgon, Inc., Pittsburgh, Pa. Calgon Metal Cleaner No. 21 is described as a dry granular alkaline detergent for spray-cleaning in metal-washing machines. In addition, it has proved effective when used in combination with the new Calgon Emulsion Cleaner, for immersion cleaning in dip tanks and for heavy-duty spray-cleaning.

A common maintenance problem in metal cleaning—the build-up of lime scale or other deposits on pipe lines, pumps, heating coils, nozzles, and tanks as a result of water hardness—is said to be effectively solved by Calgon Metal Cleaner No. 21 because it contains Calgon or glassy sodium phosphate. This chemical ties up water-hardness salts—principally calcium and magnesium—to prevent their disposition, it is explained.

Calgon Metal Cleaner No. 21, although designed primarily for cleaning of steel products or parts, is said to be well suited for a wide variety of other metals and alloys, including aluminum. It is said to be excellent as a pre-cleaner when the metal surface is to be phosphate-coated, or otherwise treated. Recommended cleaner concentration varies from ½ to 2 oz./gal., and operating temperature from 140 to 180 deg. Fahrenheit.

Calgon Emulsion Cleaner is described as a white, creamy emulsion of an organic solvent in a relatively small amount of water. It readily disperses when added to the cleaning bath. It is especially recommended for use in combined solution with Calgon Metal Cleaner No. 21 for immersion cleaning or especially difficult spray-cleaning. This mixture or combination of the two cleaners is said to provide both the advantages of an alkaline cleaner and those of an organic solvent. The organic solvent, by reducing the visco-

MINIT KOTE

CLEANS..NEUTRALIZES ..PHOSPHATIZES IN "60" SECONDS

- No Rinse Required
- Adaptable To All Washers
- Minimizes Maintenance
- Saves Time
- Saves Space

PRODUCES BETTER CLEANING—STRONGER PAINT BOND

Don't gamble paint performance over a metal surface that has been only cleaned. Follow the lead of other wise manufacturers (toys to automotive truck cabs) Phosphatize the surface with MINIT-KOTE, a new original product that cleans and provides a quality paint bond in one operation at a minimum cost. Write us your cleaning problems and ask for a KLEM Service Engineer to help you with the solution—No obligation.

BEFORE MINIT-KOTE

PHOTOMICROGRAPHS PROVE VALUE OF MINIT-KOTE

Photographs show a dirty, hot-rolled steel surface before and after a one minute wash with MINIT-KOTE at 165°F in a power washer 1% by volume concentration.

Neither paint nor primer will adhere to a dirty, oily or rusty surface. Thorough cleaning is not sufficient for a satisfactory job MINIT-KOTE cleans, removes light rust and forms an adherent phosphate coating on the cleaned surface in one economical operation Write for descriptive literature

AFTER MINIT-KOTE

KLEM *Chemicals Inc.*

OFFICES IN PRINCIPAL CITIES

14401 LANSON • DEARBORN, MICHIGAN

sity of heavy oil, aids emulsification. The combined cleaners are reportedly extremely effective for saponification of fats, deflocculation, or dispersion of dirt, and emulsification of oils and greases.

Calgon Emulsion Cleaner, when used alone or in combination with an alkaline cleaner, is said to be easily rinsed from the metal surface with either hot or cold water, leaving no solvent or other film. This is particularly important when the cleaning is to be followed by certain types of treatment, such as electroplating.

Recommended concentration of Calgon Emulsion Cleaner is 1 ounce per gallon for spray-cleaning, and 1 to 2 ounces per gallon for immersion cleaning. Temperature range recommended is 140 to 160 deg. F. Temperatures much above 160 deg. F., it is pointed out, may result in loss of solvent from the emulsion.

Kem-Lustral Enamel Line

Due to improved raw material supply, the complete line of Kem Lustral Industrial Enamels has been reinstated by The Sherwin-Williams Company.

The synthetic enamel is available in 24 colors, including black, gloss white and semi-gloss white, and can be applied to wood or metal surfaces. Because of recent advancements in synthetic resin research, the new improved formula provides greater hiding, better flow, and higher gloss, the company states.

Kem Lustral is furnished in brushing consistency and is adaptable also for spray and dip application. For dipping, a 20 per cent reduction with VMP naphtha is necessary and for spraying, a 25 per cent reduction with VMP naphtha is recommended.

The enamel air dries to touch in one hour, is tack free in four to five hours, and the film reaches wrapping hardness in eight hours. The baking schedule for whites and light colors is 45 minutes to one hour at 200-225 deg. F., and for dark colors, 30 to 45 minutes at 225-275 deg. Fahrenheit.

"Modern" OV-18S Electric Oven

Said to be ideal for baking, drying, preheating, and many other jobs, a streamline electric oven of all-polished stainless steel construction, identified as the OV-18S, is now being manufactured by the Modern Electric Laboratory, 6133 S. Wentworth Ave., Chicago 21, Ill. The outside housing, door, and base of the oven are made of No. 4 finish Armco stainless steel (Type 302, 18-8). The inside working chamber is made of No. 2 finish Armco stainless steel (Type 302, 18-8). The two adjustable wire shelves are made of stainless steel wire.

All six sides of the oven are insulated with a 2-inch layer of Thermo-O-Flake basic bonded block. The sensitive, powerful, hydraulic electric thermostat included in the oven design is fully approved by the Underwriters' Laboratory and by the Hydro Electric Commission of Canada, and has an accuracy of plus or minus 5 deg. F., the manufacturer states. The thermostat incorporates totally enclosed fine silver contacts.

The heating element of the oven consists of heavy Nichrome resistance wire spread over the entire base of the inside chamber to assure temperature uniformity. The fully insulated oven door is hung on a continuous hinge. The latch is designed to ensure safety in the event of sudden internal pressure. Two intake ports are located at the bottom of the unit and two exhaust ports with stainless steel slides are located on top of the unit. Two pilot lights provide an adequate visual check, a red light indicating unit op-

INDUSTRIAL OVENS FOR EVERY PURPOSE TO 1000° F.

HEATING: Gas • Electric • Oil • Steam • Coal • Coke • Waste Heat • Direct • Indirect.

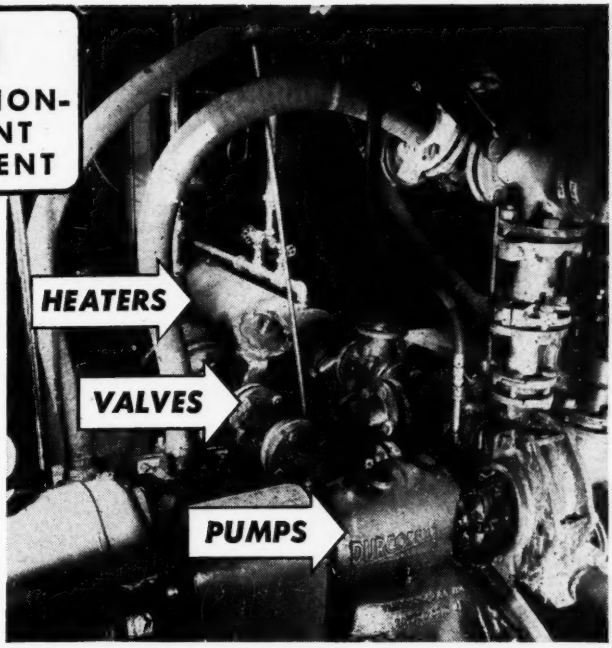
TYPES: Conveyor • Trolley • Truck • Car • Lift Rack • Shelf • Drawer • Special.

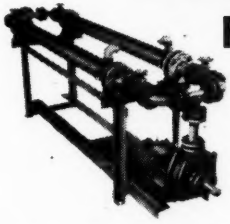
Furnished Complete with Supplementary Equipment

DESIGNED AND BUILT FOR HIGH OPERATING ECONOMY

YOUNG BROTHERS CO. 6513 Mack Avenue Detroit 7, Mich.

DURCO
CORROSION-RESISTANT EQUIPMENT





Standard Durco "packaged" units are available with one to nine or more heat exchangers in banks—together with the necessary corrosion-resistant valves, pipe, fittings and pumps—supported on one frame. For further information on typical layouts ask for folder T.

FOR CORROSIVE PLATING SOLUTIONS

These Durco heat exchangers, pumps and valves safely handle Watts nickel plating solution at the Lukens Steel Co., Coatesville, Pa.

Durco equipment is able to withstand corrosive service like this because every part that comes in contact with the corrosive is made of DURIRON. This Durco high silicon iron is completely resistant to practically every plating solution... copper, chrome, nickel and others.

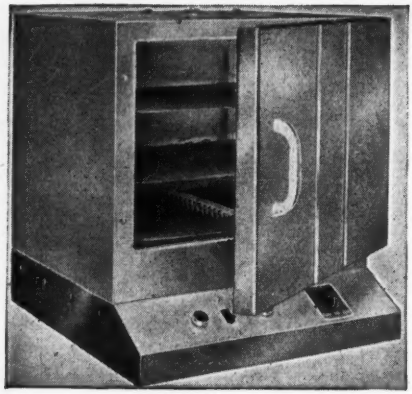
For maximum plating service with minimum maintenance, specify Durco equipment.

For further information—on Durco valves write for Bul. 610; on Durco pumps write for Bul. 815; on Durco heat exchangers write for Bul. 1603.

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

THE DURIRON CO., INC., DAYTON 1, OHIO
Branch Offices in Principal Cities

DURCO Adv. 68-GM



"Modern" 0V-18S Electric Oven

eration and a green light indicating thermostatic action. Optional equipment available for the oven includes an automatic timer and switch for controlling any set temperature within the range for any length of time from one minute to one hour.

Specifications of the "Modern" OV-18S Electric Oven are as follows: inside dimensions, 18⅞ inches wide x 14¾ inches high x 17¾ inches deep; outside dimensions, 22¼ inches wide x 24½ inches high x 24 inches deep; current consumption, 1,750 watts; voltage, 115-volt single phase a.c. or 220-volt single phase a.c.; temperature range, 100 to 550 deg. F. (38 to 288 deg. C.); thermostat response sensitivity, ± ½ deg. C.; net weight, 110 lb.; and shipping weight, 160 pounds.

General Scientific Akro-Mats

Corrugated mats, known as Akro-Mats, made of especially compounded rubber links woven on 12-gauge spring steel wire to provide sure, comfortable footing and to reduce slipping accidents and worker fatigue have been announced by the General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pennsylvania.

Akro-Mats are particularly adapted for use where moisture, oils, animal fats, acids, chemicals, solvents and abrasives are apt to be on the floor, it is claimed. Akro-Mats are available in any desired length and in widths up to 48 inches.

Bede Complete Thermal Control System

Known as the Bede Complete Thermal Control System, a hot-spray painting process with utilizes heat to create optimum spray painting conditions has been announced by Bede Products, Inc., 3309 W. 118th St., Cleveland 11, Ohio.

The main function of the process is to heat paint to any desired temperature (generally approximately 200 deg. F.) through the use of the Bede Paint Heater, which is offered two small models; namely, one that heats paint only, and one that heats both paint and air. The heater is used as an auxiliary aid to accomplish complete temperature control in spraying operations. Atomizing air and product surface can also be heated to obtain the ideal temperature combination, it is claimed.

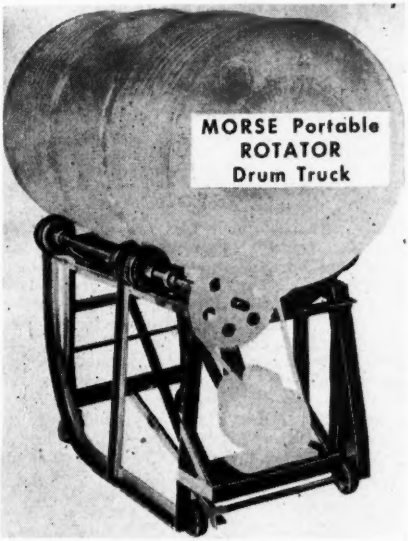
The Bede Complete Thermal Control System is said to reduce paint viscosity and the amount of thinner required, thus permitting reduced air pressure and minimum overspray. Many other advantages are claimed for the system, such as fewer sags, increased film thickness, fast drying, quick gun action, smooth finish, and high gloss.

Bede Paint and Air Heater

Morse Portable Rotator Drum Truck

Product of the Morse Manufacturing Co., Inc., 122 Dickerson St., Syracuse, N. Y., a portable drum truck that will rotate a 30 or 55-gallon steel drum by a small electric motor is now available. Some of the uses for this all-welded, rotator-type truck suggested by the manufacturer include: mixing and blending paints, lacquers, oils, thinners, chemical compounds, powders, and similar products; and tumbling and cleansing small parts.

The manufacturer claims that the Rotator Drum Truck will efficiently and smoothly revolve a maximum drum load up to 500 pounds at speeds up to 50 r.p.m.



Morse Portable Rotator Drum Truck

with a ½ h.p. motor. Swivel casters, retractable by foot lever, are at the front end to make steering easy and the retractable feature prevents slippage of the truck in loading. An extension nose piece at the front end makes loading and unloading of the drum easy, quick, and safe without the use of a crane hoist.

The ¾-inch power shaft is equipped with self-aligning bearings. Three rubber drive wheels are adjustable on the drive shaft to accommodate either a 30 or 55-

Cut Costs, Increase Output with this Fast-Baking Oven

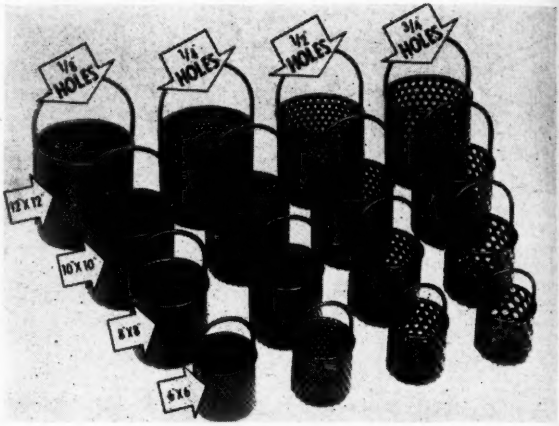
Despatch "RS" Finish Baking Ovens are very successful for repair shops and plants with small batches of products. Up to 50% faster baking . . . high volume air flow . . . approved safety system . . . gas or electric . . . moderate investment and low operating cost. Comes ready for operation—no engineer required to set it up.

Applications: For baking thermoset finishes on coils and stators; phenolic coatings on grills and unit assemblies; finish work on japans or lacquers; drying latex, ink, glues, asphalt; light core baking, dehydrating; preheating plastics, aging, and drying, etc. Fast curing or drying of synthetic films, dulux, lacquer, enamels.

Write for bulletin on RS-4 and RS-5 Ovens.

DESPATCH OVEN CO.
Established in 1902
327 Despatch Bldg. Minneapolis 14, Minn.

Insulated Dipping Baskets



gallon drum. These, plus two rubber idler wheels, give a 5-wheel support to the revolving drum.

Fast, complete drainage of the drum can be made from front or bottom. One side of the Rotator truck frame is open to allow a pail or other container to be set on the floor underneath the drum for drainage.

New Standard Line of Insulated Dipping Baskets

A new standard line of insulated baskets for dipping, pickling, and general use in submerging parts or products in corrosive solutions has been produced by Automotive Rubber Co., Inc., 8601 Epworth Blvd., Detroit 4, Michigan.

The new baskets, fabricated from heavy gauge, reinforced, perforated steel with welded joints, are completely covered with ⅛-inch thick, shock-proof, semi-hard pure rubber.

The Arco process provides for coverage of all faces of the hole with rubber, small perforations being filled solid and drilled out. Thus, positive protection for both basket and solution is assured, it is claimed.

Four sizes of perforations are offered with finished hole sizes of ⅛, ¼, ½, and ¾ inch. Four sizes of baskets are offered in each hole size; 12-inch diameter x 12-inch depth, 10 x 10 inches, 8 x 8 inches, and 6 x 6 inches. Rigid bails welded to the body are also completely rubber covered.

BERKS REFINING Company

• Recover your valuable waste solvents. The BERKS *individual batch* method—under rigid laboratory control—assures quality results. Tell us solvents you wish restored and our money saving quotation will reach you promptly.
Write P. O. Box 52, Pottstown, Pa.
Phone: Birdsboro 2-2956.

Ampco Spray Booth Kit

A well-selected assortment of non-sparking tools suitable for cleaning or making repairs around a paint spray booth constitutes the Ampco Spray Booth Kit produced by Ampco Metal, Inc., 1745 S. 38th St., Milwaukee 4, Wis. Included in the kit are a claw hammer, long blade scraper, deck scraper, spray booth scraper, screw driver and chisel, made of Ampco metal or Ampco beryllium-copper which do not emit sparks in contact with steel spray booth walls. The hazards involved in maintenance work in finishing departments are thus materially reduced.

Alfco Silicon Bronze Fire Extinguishers

American-LaFrance-Foamite Corp., Elmira, N. Y., has announced a new line of 2½-gallon resistance welded silicon bronze fire extinguishers to replace riveted and copper fabricated units of the same capacity. They are soda-acid, foam, plain water, and anti-freeze water types.

Each fire extinguisher is lighter in weight by 4½ lb., but the manufacturer claims that it is stronger because the materials used have higher tensile strength. Additional features include resistance welded seams; welded hemispherical

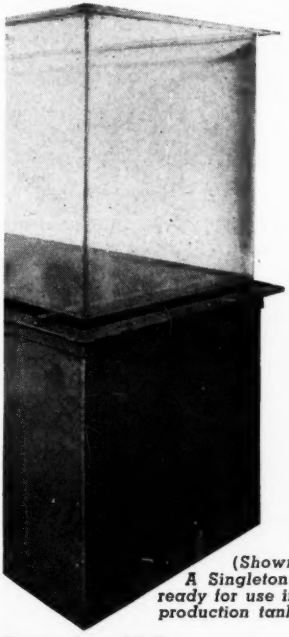
Alfco Silicon Bronze Fire Extinguishers

domes, top and bottom; silver soldered elbow pads; projection welded hanger loop; new wider bottom handle; interchangeable caps, collars, and gaskets; new spot welded name plates with identifying colors for each type unit; and transparent plastic nozzle, providing clear vision of passageway and greater resistance to accidental blows which could close the passage of ordinary lead nozzles.

"Stand-eze Softaire" Rubber Mat

"Stand-eze Softaire" Non-Skid Rubber Mat for the relief of fatigue from standing, manufactured by the Colonial Rubber Co., Ravenna, Ohio, has recently been improved for greater comfort.

According to the manufacturer, the cellular structure has been enlarged and the mat now contains over 2,000 small resilient cells, which provide for greater resiliency and greater ability to handle heavier weights. Each of the more than 2,000 small rubber cells acts individually and collectively to protect legs and feet from nervous strain due to long periods of standing. Thin rubber strips of the toughest rubber criss-cross each small cell and when the mat is stepped on these cells provide an "air pillow" action. Each cell is also designed to collect and hold air, adding greatly to the resiliency of the mat. The flat standing surface has no ridges or bumps to tire the feet or collect dirt. This two-way shock absorbing action of the air retaining cells and the



(Shown) A Singleton Liner ready for use in steel production tank.

Your tanks last a lifetime

with Singleton Hi-temperature Lucite Liners* . . . permanent protection for all plating, processing

Fit *all* your tanks, new and used, with Singleton H-T Lucite Tank Liners! Sensational, proven performance, unequalled throughout the industry. They resist all acids, alkalies, even super-active mixtures at 220° F. No contamination, no deterioration, no current losses. Leakproof and shatterproof. Lightweight for easy handling, machineable for utility.

Lab Tanks, Cells Baskets, Buckets Grids, Racks, etc.

All Singleton-Welded Products are made of H-T Lucite. Each introduces an entirely new standard of high performance—finest of its kind in the field. No other products are comparable. Today, Singleton-equipped plants enjoy greater returns on equipment investments than ever before.

*** Write for Bulletin and Price List.**

SINGLETON COMPANY

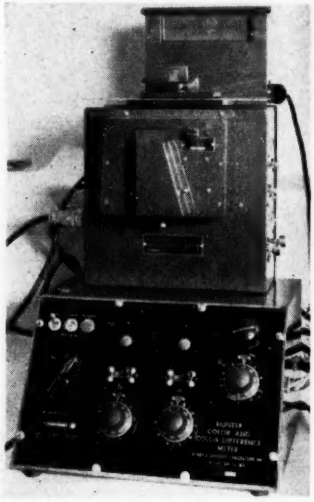
9823 Lorain Ave. ★ Cleveland, O. ★ WOodbine 9056

"squeegee" motion of the thin rubber strips within each cell provide the Standeze Rubber Mat with a resiliency that relieves fatigue, it is claimed.

Hunter Color and Color-Difference Meter

Henry A. Gardner Laboratory, Bethesda 14, Md., has announced the new Hunter Color and Color-Difference Meter. Developed by R. S. Hunter, formerly of the National Bureau of Standards, this is a photoelectric instrument measuring values of color directly on three 10-turn potentiometer rheostats: for R*d* (reflectance), **a** (redness-greenness), and **b** (yellowness-blueness). A major feature of the measurement circuit is the manner in which photocell currents for the chromatic dimensions of color are automatically adjusted for level of reflectance to provide instrument settings corresponding to visual perceptions of color. When the three potentiometer rheostats are set to the values of some standard color and a specimen of somewhat similar color is placed in exposure position, deflections of the current-detecting galvanometer then show the numerical magnitude of the color difference between the specimen and the standard.

Although it is intended primarily for reflecting materials, an attachment is available to measure color by transmitted light. The new apparatus is well suited for color standardization, color tolerance work, quantitative shading, fading, studies of color mixtures, and the like. It should find many applications in the paint, textile, plastic, paper, and ceramic industries. The new apparatus consists of (1) an exposure unit having light source, panel for holding specimens, and six photocells with filters attached, and (2) a measurement unit for evaluating currents from these photocells in terms of color. This same measurement unit may be used with other exposure heads to also measure gloss and other photometric properties of materials.



Hunter Color and Color-Difference Meter

Color Buffing Composition 6-B-72

The Hanson-Van Winkle-Munning Company, Matawan, New Jersey, has announced a new bar composition for color buffing carbon steel, stainless steel and chromium plate. This composition is designated as 6-B-72.

The manufacturer states that in order to produce a good color on the above metals, free from cloud or cast, it is necessary that the compound produce a very light and soft face on the buff with sufficient lubrication to prevent scratching. Compositions producing this type of buff face usually have limited cutting ability.

It is claimed that 6-B-72 Composition has a binder that retains the abrasive on the buff face for a greater period of time, permitting it to do its cutting without building up a heavy waxy face on the buff.

ALLWOOD

"Vienna Brand" Lime

Made from Limestone that is identical in chemical analysis and geological structure with European Imported Lime. Tests show a "lime cake" made from Allwood "Vienna Brand" Lime equals the finish made from imported lime.

WRITE FOR FULL PARTICULARS

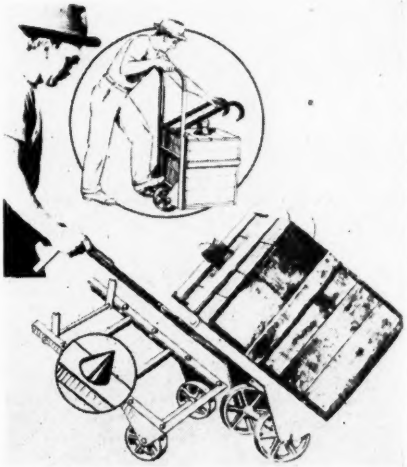
ALLWOOD LIME COMPANY

Manitowoc • Wisconsin

Palmer-Shile Carboy Truck

A truck designed to facilitate handling of carboys containing acids and other chemicals has been announced by the Palmer-Shile Co., 16022 Fullerton Ave., Detroit 27, Michigan.

In operation, the truck is rolled against the side of the carboy and the gripping yoke dropped over the carboy top. When the truck handles are pulled back from the vertical position, hardened steel studs on the truck frame in combination with the gripping yoke over the top hold the carboy firmly in place so that it may be rolled easily from place to place.



Palmer-Shile Carboy Truck

The carboy truck is said to be well designed for efficient handling and sturdily constructed for long life. Rubber, pneumatic, or metal wheels are available depending upon individual requirements.

Northwest Metal Cleaner SC-9

A new type combination alkali-emulsion cleaner that will remove oils and tallow based drawing compounds is announced by Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich., for use in pressure washing equipment. It is said to be particularly adapted to general washing machine use prior to phosphatizing and painting, and as a precleaner

Whatever your problem in finishing zinc or cadmium, there's an Iridite* to do the job. Iridite, a quick-dip, chemical treatment, offers you these three advantages:

1. EYE APPEALING FINISH . . .
On plated parts Iridite forms a long lasting, sparkling *bright* finish that *stays bright*, even after handling, storage, exposure. On all surfaces, Iridite can be used to produce a variety of colored finishes.

2. RUSTPROOFING . . .
Resistant to the attack of water, gasoline, and ordinary corrosive conditions, Iridite provides the ideal *final finish* for all zinc and cadmium surfaces.

3. BASE FOR PAINT . . .
On any zinc or cadmium surface that must be painted, Iridite insures a better finishing system because the coating improves initial paint adherence, blocks corrosion *under* paint, blocks metallic soap formation *between* paint and metal.

Tell us the type of finish you need for zinc or cadmium — let us tell you how Iridite can help. For information and samples, write to:

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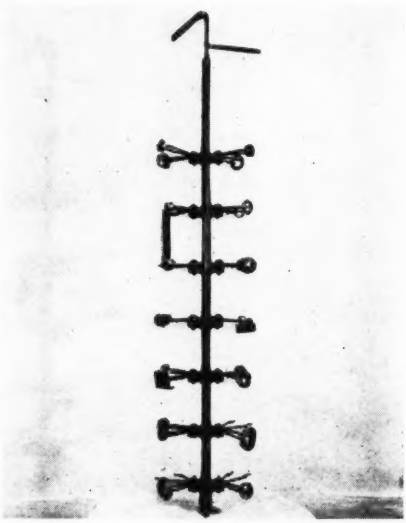
301 Chemical Building
4004 E. MONUMENT ST. • BALTIMORE 5, MD.
Manufacturers of
IRIDITE
DISTRIBUTORS IN PRINCIPAL INDUSTRIAL AREAS
*REG. U. S. PAT. OFF.

prior to plating. A petroleum derivative contained in Northwest Metal Cleaner SC-9 aids in controlling foam and the formation of rust, it is claimed.

Naraco Plating Rack



Naraco Plating Rack

The National Rack Co., Inc., Fair Lawn, N. J., has announced a custom-built plating rack featuring Naraco removable and replaceable work holders.

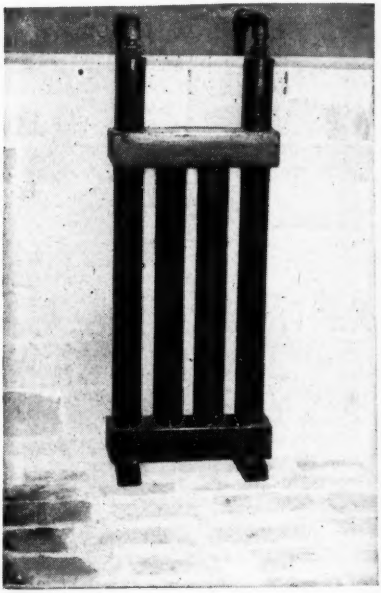
The rack is insulated with a 100 per cent-solids plastisol type of rack coating which is said to provide a substantial and permanent rack insulation. The manufacturer claims that the insulation will resist chemical attack in any standard plating bath or cleaning cycle and can be used in copper, nickel, and chrome plating solutions in succession.

The replaceable work holders may be removed and replaced without injuring the rack, it is claimed.

Nocordal Grid Heat Exchanger

Designed for improved efficiency and long life, a new rugged Nocordal grid heat exchanger has been announced by the Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11, Ohio.

According to the manufacturer, the Nocordal Grid Heat Exchanger possesses the following advantages: rugged compact design; versatility of application; and efficient adaptation of heat transfer principles, as demonstrated by the provisions made for free flow of convection currents around smooth non-clogging surfaces. In common with the other Heil Nocordal heating units, the grid heat exchanger is said to possess excellent corrosion resistance to most acids, alkalis, solvents, and salt solutions. Low thermal expansion and resistance to thermal shock are additional properties of these



Nocordal Grid Heat Exchanger

impervious graphite heating devices, it is claimed by the manufacturer of the product.

In addition to the Nocordal Grid Heat Exchanger other heating units manufactured by the company, including tube immersion units, electric tank heaters, steam jets and shell and tube exchangers, have also been redesigned for improved efficiency of operation, and resulting economy.

Blasto Spray Gun

A lightweight, all-purpose spray gun that can be used for both flocking and sandblasting has been announced by the Blasto Spray Gun Manufacturing Co., Los Angeles, California.

Designed for operation with small air compressors, the gun uses only 3 c.f.m. at 30 pounds of air pressure. A specially designed, low-pressure, high velocity head that can be used for flocking or sandblasting is standard equipment.

According to the manufacturer, the

Blasto Spray Gun

Blasto Spray Gun is a non-bleeder type of spray gun but it can be used as a bleeder type by removing the trigger valve assembly and thus providing for air flow through the trigger hole when the gun is not in use. While the Blasto Spray Gun is a syphon-type gun, no air pressure is forced into the glass jar used as a flock or sand container. Standard Mason jars are used, easily replaceable when changing colors, and convenient as storage containers.

The gun is constructed of solid aluminum alloy casting, precision machined, with heavy brass fittings and chrome molybdenum heat-treated high velocity sand nozzle and air jet. Featuring a wide variety of uses, the gun can be used not only for flocking but for sandblasting designs in glass, wood, metal tools, and for many other handy purposes.

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DRAWING COMPOUND
&
GRAINLOCK
POLISHING-WHEEL CEMENT
Two of the oldest names in the field
INDUSTRIAL LUBRICANTS COMPANY
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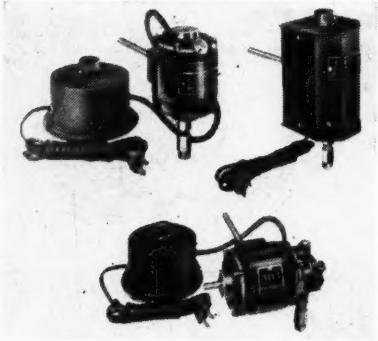
DETROIT 8, MICHIGAN

Palo-Myers Industrial and Laboratory Stirrers

Three new laboratory stirrers in both direct and gear drive types have been introduced by Palo-Myers, Inc., 81-83 Reade St., New York 7, N. Y. The units feature complete speed control and stainless steel mounting rods so designed that the stirrers may be mounted on standard laboratory supports if desired.

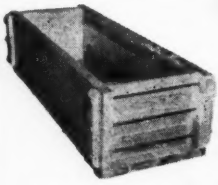


Palo-Myers Industrial and Laboratory Stirrers

Model 7605D is a direct-drive, medium powered stirrer for continuous duty in general laboratory work. This model features a double housing, offering extra fume protection. The 1/50 h.p. motor operates on 110 volts, a.c. or d.c. Rheostat speed control of from 0 to 10,000 r.p.m. and a ¼-inch true running chuck are features of the model.

Model 7605E, a powerful direct-drive laboratory stirrer, has a 1/12 h.p motor which equips it for the heavier stirring applications and makes it practical for many semi-industrial jobs. Table-top speed control rheostat regulates speed from 0 to 5,000 r.p.m. Model 7605E operates on 110 volts, a.c. or d.c.

Model 7609C is the heaviest gear drive stirrer of the Palo line. It incorporates all the features of power, ruggedness, and durability, with the addition of reduction gears providing high torque at low speeds. The 1/18 h.p. motor, operating on 110 volts a.c. or d.c., has a high speed shaft to 83 r.p.m., with a maximum torque of 3.0 inch-pounds.



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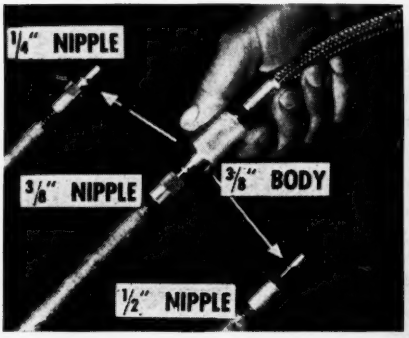
173 Arlington Avenue, Clifton, N. J.

Ronaflex Interchangeable Assemblies

Increased convenience for the user and substantial reduction in flexible tubing parts inventory are now possible through a design development announced by Ronaflex Tubing Co., Inc., Packard Bldg., Philadelphia 2, Pennsylvania.



Ronaflex Interchangeable Assemblies

Ronaflex Assemblies, composed of flexible tubing fitted with snap-on couplings, are interchangeable on various nipples. As illustrated, the ⅜-inch Ronaflex coupling body fits ¼, ⅜, and ½-inch nipples, The ¼ and ½-inch bodies also fit all three nipples.

The manufacturer states that the degree of interchangeability varies with the type of coupling (regular or self-sealing) and with the size. The 1½ and 2-inch regular coupling bodies, for example, are interchangeable with 1½ and 2-inch nipples. Thus, a limited number of

sizes of Ronaflex Assemblies will fit a wide variety of nipple sizes. Only a relatively few sizes of Ronaflex Assemblies need be stocked.

Lithgow LC-600 Air-Drying Coating

Unusual ease of application without a primer, maximum corrosion resistance, and durability are outstanding features claimed for an air-drying coating designated as LC-600 now being marketed by the Lithgow Corp., 333 W. 40th Place, Chicago 9, Ill. The coating is intended for use in tanks, driers, pipe fittings, filter bodies, and various other equipment.

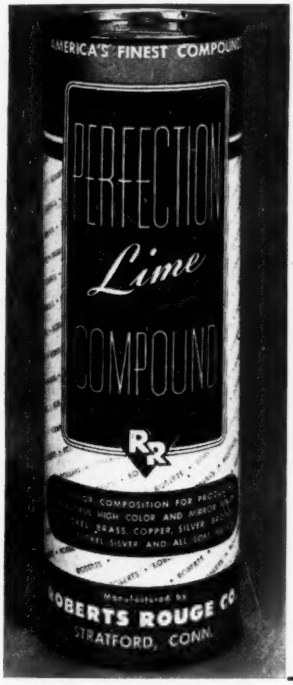
Embodying newly developed properties based on inert synthetic resins, Lithgow LC-600 Air-Drying Coating may be sprayed, dipped, flowed, roller coated, or brushed on practically any clean unpolished, de-rusted surface. According to the manufacturer, the material is odorless, tasteless, and positively resistant to acids, alkalis, chlorides, oils, salts, oxygen, and alcohol solutions. Electrochemical corrosion is claimed to be inhibited by the high dielectric strength of the coating.

New Rack Coating Tape

A new and improved orange-colored Wrap-Rax, a synthetic resin in easy-to-use tape form for insulating plating racks, is announced by the Hanson-Van Winkle - Munning Co., Matawan, N. J. The tape is said to be effective as a stop-off in hard chromium and other plating solutions.

The manufacturer claims the following advantageous properties for the improved orange-colored Wrap-Rax insulating tape: abrasion and wear resistance, durability, plasticity, excellent resistance to cleaning and plating chemicals, uniform surface coverage, and ease of application. Through the protection of the plating racks from chemical and electrochemical action, disintegration of the plating racks and current and metal losses are minimized.

Wrap-Rax Tape is furnished in 250-foot rolls ¾ inch wide and can be used on old racks as well as new ones.



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GUARANTEES A
BRILLIANT LUSTRE
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SILVER • BRONZE • MONEL
NICKEL SILVER and ALL SOFT METALS

Here is a very fine buffing lime with a 100% Saponifiable Binder. Used with outstanding success on flat surfaces as well as on intricate designs. Eliminates final scrubbing and cleaning. Convince yourself . . . . .

Send for ***Free Sample***

THE ROBERTS ROUGE CO.
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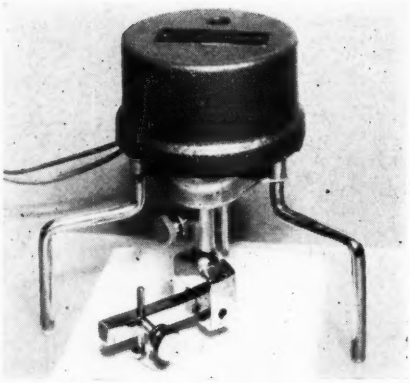
Gardner Circular Drying Time Recorder



Gardner Circular Drying Time Recorder

A device to measure the drying characteristics of organic finishes and materials has been developed by the Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Maryland.

Known as the Gardner Circular Drying Time Recorder, the apparatus is operated in the following fashion: the Recorder is placed over a wet film applied to any plane surface, and an electric timer motor is started. A weighted pin, attached to a scribing arm driven by the timer motor, leaves a solid arc-shaped pattern in the film until the film has dried; then the pattern is broken. By measuring the length of the solid arc and comparing that with a graduated scale based on the fact that the scribing arm makes one revolution every 24 hours, the drying time of the material can be determined. The test plate thus forms a permanent record.

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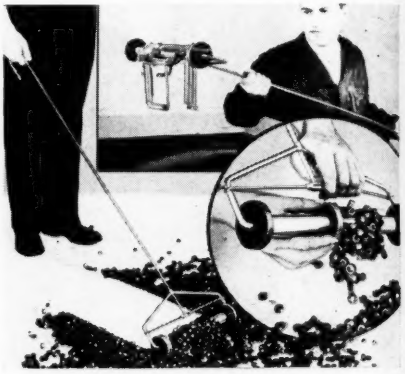
Multilift Rotary Magnet

New loading and releasing principles feature a non-electric Multilift Rotary Magnet manufactured by Multifinish Mfg. Co., Dept. 491, 2114 Monroe Ave., Detroit 7, Mich. Designed to provide increased carrying capacity plus efficient releasing, the magnet can be used for retrieving from tanks, separating ferrous from non-ferrous materials, picking up steel from floors, or nails from parking lots, cleaning tramp iron from conveyors, and many other purposes.

The manufacturer states that the unit will retain its strength forever without charging, requiring no wires or electricity. The Alnico permanent magnets



Multilift Rotary Magnet

are sealed in a metal tube mounted rigidily between Neoprene wheels in the carrying frame. For operation, the handle is attached to the frame and the unit is rolled; the tube revolving with the wheels and the entire magnetic surface becoming loaded, thus providing capacity greater than when only the underside of the magnet can be used. Load-handling capacity depends on size, weight, and iron content of load components.

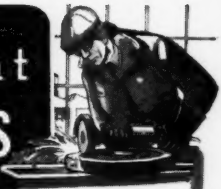
Unloading is accomplished by pushing the Neoprene wiper ring to a non-magnetic area at one end, where the load drops off. "Grabbing" tanks is prevented by the wheels.

Elliott Improved Flexible Shaft Machine

Said to be more streamlined, more versatile, and more efficient than its predecessor, the Elliott Improved Flexible Shaft Machine illustrated herewith, product of the Elliott Manufacturing Co., Binghampton, N. Y., is applicable to polishing and grinding operations and features a new type of countershaft mounting located well above the motor tilt axis to provide adequate endwise yielding motion to the flexible shaft as the operator tilts the motor assembly, thereby reducing strain on the operator. The countershaft includes a vertical adjustment operating on a lead-screw principle, with finger-tip knob control. With a standard three or four-step cone pulley on the motor shaft, the vertical adjustment is operative through more than 4 inches to provide for positive and accurate belt tensioning. By substituting an optional variable pitch pulley for the cone pulley on the motor shaft, the vertical adjustment provides stepless speed variations through a ratio of over 2 to 1.

Elliott Improved Flexible Shaft Machine

Edmont GLOVES



made to take the tough, daily grind!

For product finishing and preparation, there's an Edmont fabric-lined, rubber-coated glove to fit your needs. Many years of experience in industry proves they outwear ordinary gloves many times over. Check these principal features:

- Curved fingers molded in natural position.
- Soft high tensile inner fabric.
- Uniform narrow seams for maximum hand comfort.
- Waterproof dirt-proof, snag-proof.

Sizes available for men and women in knit wrist style or with gauntlet in a variety of lengths.

See your SAFETY EQUIPMENT or INDUSTRIAL SUPPLIER

Edmont

Fabric Lined RUBBER GLOVES

Edmont Mfg. Co., 509 Orange St., Coshocton, O.

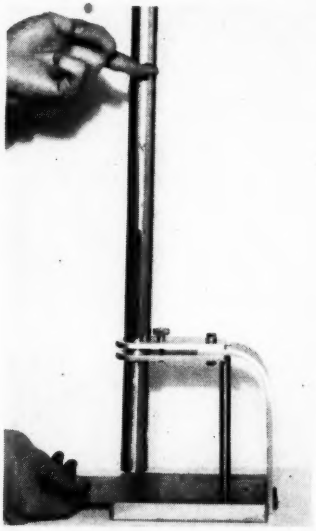
An improved hinged guard with shock mounting is arranged to swing away from the drive pulley at the press of a button, exposing the parts so as to facilitate changing of belts. Additional features of the machine include a simplified toggle switch mounting incorporated in the motor end bell, a circular tool tray (optional equipment), and a utility box over the motor for small wrenches and accessories. All handpieces, countershafts, and motors are of ball bearing construction, and a ball thrust bearing is employed for pivoting the welded steel yoke. The machine utilizes non-ravel flexible shafts of cold-worked music wire operating within reinforced rubber cases.

Variable Impact Tester

An instrument designed to provide a method of determining impact resistance of various types of coatings has been announced by the Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Md. Designated as the Variable Impact Tester, it was developed to conform with the method of determining impact resistance of paints, varnishes, lacquers, and other finishes on steel in accordance with the requirements of the Steel Kitchen Cabinet Institute Specification, Section V.

The tester is composed of a base plate, a round-nosed steel rod impact weight which engages a hole in the base plate, a slotted tube in which the rod is lifted and dropped and along which are inch-pound graduation marks, and a bracket to hold the tube in a vertical position.

Impact resistance is determined by subjecting either or both sides of a metal panel to an impact of 2 inch-pounds up to 28 inch-pounds in interval steps of 2 inch-pounds. The panel is placed over the ½-inch hole in the base plate. The 2-lb. steel rod is raised by lifting the pin which extends from the rod through the slot in the tube. The rod is raised until the pin coincides with the desired inch-pounds graduation mark on the slotted tube, and then dropped. The test panel is then examined for flaking and cracking.



Variable Impact Tester

Another method of operation is to place a steel ball in the tube and allow the ball to rest upon the test panel. The rod is then raised and dropped on the ball.

"Traffic-Tred" Safety Floor Finish

To reduce industrial accidents caused by slips and falls resulting from hazardous footing, the Industrial Safety Products Division, The Watson-Standard Co., 225 Galveston Ave., Pittsburgh 30, Pa., is offering a safety floor finish to be known as "Traffic-Tred."

An abrasive floor coating which can be applied like paint, Traffic-Tred, according to the manufacturer, dries to a hard rough surface with a texture similar to coarse sandpaper, and works equally well on steel, concrete, or wood, removing most of the danger from walking areas subject to dampness, greasiness, and other slippery conditions.

ALAKA Lacquers
QWIK-BAKE Synthetics
ALAKATONE Hammered Silver
SYNTHALAK Air-dried Synthetics
Custom Tailored Finishes TO FIT YOUR REQUIREMENTS
LACQUER & CHEMICAL CORPORATION
222 FORTIETH ST. BROOKLYN 32, N.Y.

Dennis No. 5062 Lacquer

A new metal lacquer has been developed by the Dennis Chemical Co., 2701 Papin St., St. Louis, Mo., for use where oil resistance, toughness, and maximum adhesion are required. Dennis No. 5062 Lacquer will withstand 24-hour immersion in gasoline and 15-minute immersion in hot oil (275 deg. F.) with no apparent deterioration in film strength or gloss, it is claimed. This coating is said to have excellent adhesion to a variety of metal surfaces and has found particular application over chromated zinc surfaces, for example. A complete line of colors is available.

Edmont Swaggerette Gloves

Natural rubber-coated gloves for women, lined with soft, napped fabric have been developed by Edmont Manufacturing Co., Coshocton, Ohio. The gloves, marketed under the trade name Swaggerette can be used advantageously in such operations as assembling or inspecting parts, handling rough, sharp, dirty or harmful materials, it is claimed. Affording ideal protection against skin irritations, the gloves are said to be easy to put on and take off, and are flexible and comfortable.

Edmont Swaggerette Gloves

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Each unit of an efficient finishing system must be designed to give you the best possible service in coordination with the other units. Young & Bertke engineers are prepared to build your ovens, conveyor or batch type, spray booths, air filter systems, etc. of any size or capacity to best fit your individual needs.

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PRODUCT LITERATURE

"About Overhead" is the title of Book No. 2158 issued by the Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. The 10-page, attractively illustrated catalog describes several specific installations of Link-Belt chain conveyor equipment to indicate its wide range of application. Copy free upon request.

G.E. Silicones. A 30-page illustrated bulletin describing in detail G-E silicone products has been issued by the General Electric Co., Chemical Dept., Pittsfield, Mass. The bulletin describes the new G-E silicone resins, oils, greases, water repellents, and rubber, together with their many industrial uses. Charts and tables are included for handy reference. Copy of Bulletin No. CDR-57 free upon request.

"Dekadhese" Adhesive. A four-page folder describing "Dekadhese" is being distributed by the Technical Specialties Co., P. O. Box 1468, Wilmington, Del. The folder suggests applications in which the adhesive might serve in an efficient manner. The applications listed stress the wide range of uses for Dekadhese. Copy free upon request.

AAF Electro-PL Electronic Air Filter, which consists basically of an electronic precipitator without an ionizing unit and contains a collector element of electrostatically charged Airmat paper, is fully illustrated and described in a 12-page bulletin published by the American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky. In addition to complete information on the construction features and advantages of the filter, the bulletin contains suggested specifications, installation data, and other helpful material. Copy of Bulletin No. 257 free upon request.

Nuodex Products. A four-page two-color folder discussing the Nuodex line of fungicides has been issued by Nuodex Products Co., Inc., Elizabeth F, N. J. Included are descriptions of the function and use of several of the products. Copy free upon request.

Durimet 20 Bulletin. An eight-page bulletin designated as Bulletin 112 describing the properties of a high alloy low carbon austenitic stainless steel—Durimet 20—has been issued by The Duriron Co., Inc., Dayton 1, Ohio. The bulletin stresses the resistance of Durimet 20 to corrosion by various concentrations of sulphuric acid as well as by many other corrosive materials. Chemical composition, mechanical properties, physical properties, and heat treatment of Durimet 20 are listed in the bulletin. Copy free upon request.

"Permag" Industrial Cleaning Compounds. The Magnuson Products Corp., 50 Court St., Brooklyn 2, N. Y., has available a brochure containing numerically and alphabetically inserted information sheets on "Permag" industrial cleaning compounds, including Permag No. 23 for paint stripping; Permag No. 39 for burnishing brass, aluminum, steel, and so on, in burnishing barrels; Permag No. 43 Tubbing Compound; Permag No. 50-A for cleaning copper and brass in a hot aqueous solution without current; Permag No. 187 Stripping Compound; Permag No. 210 for the removal of buffing compound from copper and brass prior to electrocleaning; Permag No. 299 for the direct current cleaning of copper and brass; Permag No. 910 Masking Compound; Permag 921 Stripping Compound; Permag No. 927 for descaling and rust removal operations; Permag No. 1550-W for cleaning aluminum; Permag No. 1557 for the removal of oil, grease, and soil from steel; Permag No. 1575 for use in water wash spray booths; and Permag Ferro-lyte Anodic Steel Cleaner. Copy free upon request.

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Opportunity Section

FOR SALE—New Burdette Gas-Fired Baking Oven 100 ft. long, 7 ft. 4 in. wide, 8 ft. high inside dimensions. Complete with motor, blowers, controls. With two spray booths and continuous conveyor. For immediate delivery. A bargain. Write Box 99, Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

I am a young man with an existing large factory and practical knowledge; also commercial abilities in connection with Electro-Plating on PLASTICS, GLASS, CHINA, PAPER, everything in connection with non-conductive articles. Wish to correspond with firms already established in metal plating. Samples sent with details on request. B. Berger, 22 Farm Avenue, London, N.W. 2, England.

FOREMAN, Buffing-Polishing Dept. Man wanted with general job shop experience in preparing brass and bronze castings for high quality plating. Will supervise crew of fifteen and must be able to train new men, assist in cost estimating and setting production standards. Salary arranged. Living quarters available on company property. Apply to Bridgeport Brass Co., The Exeter Brass Co. Division, Exeter, N. H.

FOR SALE: Almost new Udylite Full Automatic Plating Machine complete with rectifiers and other accessories including 6000 lbs. nickel anodes. Complete information furnished on request to Box 92, Products Finishing, 431 Main St., Cincinnati 2, Ohio.

INDUSTRIAL FINISHES SALESMAN WANTED
Salesman with knowledge of industrial finishes and modern finishing methods, to sell recognized quality industrial finishes in Cleveland and surrounding territory. Write The Egyptian Lacquer Mfg. Co., RKO Bldg., Rockefeller Center, New York 20, N. Y.

Box type Drying Systems Bake Oven 14 ft. x 19 ft. x 7 ft. high with three 44" doors on each end. Indirect gas fired type baking up to 400 deg. All electrical safety controls. Only 6 years old.

GRAND SHEET METAL WORKS
2501 W. 24th St. Chicago, Illinois

EXCEPTIONAL OPPORTUNITIES

One of the oldest established manufacturers of Aluminum Paints, Bronze Powders, Paints, Lacquers, Thinners, etc., has openings for the services of several experienced and successful salesmen in the Paint, Hardware and Industrial Finishing Field who have had a broad experience in selling to Wholesalers and Retailers. We are prepared to start the right persons off with a salary of not less than $7,500 a year, or a drawing account against commissions. Further information as to territories to be traveled and details can be obtained upon inquiry.

ILLINOIS BRONZE POWDER CO., INC.
2023-29 S. Clark St. Chicago 16, Ill.

Wanted Salesmen

Experience working in industry selling solvents, soaps, synthetic detergents and process cleaning compounds. Must have car. Liberal jobber's discount and proposition to the right man. Write me personally! H. Fischer, President.

FISCHER INDUSTRIES, INC.
Cincinnati 29 • Ohio

FOR SALE

3—Type 101 Production Polishing Machines—in tandem. Complete with polishing wheel 16" x 4 ft. face, and air way buffs. Serial No. 7285-86-87.
1—25 h.p. Motor.
1—Magnetic starter and push button control.
Set 8 foot section Idler Roll supporting guide fixtures.
Excellent condition used less than 6 months.

Full information write
HEDSTROM UNION CO., Fitchburg, Mass.
Purchasing Department

Representative Wanted

Leading manufacturer of industrial washing machines requires services of qualified salesman for the Cleveland territory. Must have sales experience and thorough knowledge of metal cleaning machinery.

State experience and qualifications for prompt consideration.

Reply box number 94, Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

This Opportunity Section is available for classified advertisements. For advertisIng rates and other information address:

PRODUCTS FINISHING
431 Main Street • Cincinnati 2, Ohio

5—Filters Adams Type CFR3; 1—42 x 72 ASME Surge Tank, for nickel plating solution; 1—Udylite 5000 amp. 6 volt 3V drop electro plating tank rheostat. Write for description. Priced right. A. S. Campbell Co., B. R. Warshaw, East Boston 28, Mass.

Recirculair Blower Type Unit Heaters are described in 12-page two-color Bulletin 483 available from the New York Blower Co., 32nd St. & Shields Ave., Chicago 16, Ill. Details of construction and installation in addition to comprehensive technical data are included. Copy free upon request.

Kaykote Bulletin. A four-page technical data bulletin listing the properties of Kaycote, a low-temperature corrosion-resistant ceramic coating, and describing application and uses of the material is being distributed by Lasting Products Co., Kaykote Division, Baltimore 23, Md. Copy free upon request.

Portable Silver Plater Circular. An illustrated two-color circular describing the use of the Rapid No. 37E Portable Silver Plater in coating bus bars, switches and fittings is available from Rapid Electroplating Process, Inc., 1414 S. Wabash Ave., Chicago 5, Ill. Copy free upon request.

Du Pont Booklet. A booklet entitled "Elvanol Polyvinyl Alcohols" has been issued by the E. I. du Pont de Nemours and Co., Inc., Wilmington 98, Del. The booklet describes the physical and chemical properties, commercial grades, uses, and applications of these resins. One application described which should be of particular interest to the finishing field is that of the use of Elvanol tubing to facilitate the handling of paints, lacquers, dry cleaning solvents, and compressed air.

"Practical Nickel Plating" is the title of a 44-page illustrated booklet issued by The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y. The booklet, the latest plating publication written by International Nickel Company technicians, is a compilation of existing literature on the subject of industrial nickel plating.

Solution compositions and operating conditions are recommended and discussed. Process cycles are suggested. Plating difficulties, their cause and correction are cited. Solution purification methods are outlined. Copy free upon request.

CATALOGS

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Roxaprene
A brochure outlining detailed specifications for drying, application, adhesion, flexibility, resistance to chemicals, and other properties of Interchem Roxaprene Low Bake Finish has been issued by the Interchemical Corp., Finishes Division, 57 State St., Newark 1, New Jersey.

2. Solvent Degreasing
A 16-page booklet which emphasizes fundamental practices for the economical use of degreasing solvents in metal cleaning departments of industrial plants and describes typical kinds of degreasers has been published by the Detrex Corp., Box 501, Roosevelt Park Annex, Detroit 32, Michigan.

3. Synthetic Resins
A 20-page technical booklet which includes a description of the properties and uses of all Hercules synthetic resins is now available from the Hercules Powder Co., Inc., Wilmington, Delaware.

4. Industrial Lacquers
A color card containing samples of the variety of colors of Pittsburgh industrial lacquers for wood and metal, together with suggestions for application of the lacquers, has been issued by the Pittsburgh Plate Glass Co., Industrial Paint Division, Pittsburgh, Pennsylvania.

5. Cold Stripper
Literature on a cold stripper for removing paints, enamels, synthetics, lacquers, and wrinkles from aluminum, brass, copper, magnesium, zinc, steel, cast iron, or their alloys is available from the Allied Finishing Specialties Co., 2637 W. Grand Ave., Chicago 12, Illinois.

6. Metal Fluoborates
Bulletin 1015-A containing general information on metal fluoborates, plus specific operating data on plating with lead, tin, and cadmium fluoborate, is now available from the General Chemical Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, New York.

7. Polishing Wheels
Data on a wide variety of polishing wheels for all metals, as well as on abrasives, glue, and accessory products, are contained in a bulletin now being offered by the Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

8. Metal Cleaning Equipment
A folder telling how seven famous companies solved their production cleaning problems is now being issued by The Alvey-Ferguson Co., 631 Disney St., Cincinnati 9, Ohio.

9. Process Equipment
An eight-page general catalog issued by The Duriron Co., Inc., Dayton 1, Ohio, provides a brief description of a complete line of corrosion resisting equipment, including pumps, pipes, valves, heat exchangers, steam jets, and so on.

10. Surface Preparation
A special service report on Oakite Surface Preparation for aluminum and its alloys is now available from Oakite Products, Inc., 20 Thames St., New York 6, New York.

11. Flexible Lacquers
The Randolph Products Co., Carlstadt, N. J., is now offering technical information and specifications on flexible lacquers which can be sprayed, dipped, or baked.

12. Filters
Alsop Engineering Corp., 304 Keen St., Milldale, Conn., is now issuing a profusely illustrated book designated as Catalow P-347 explaining the fundamentals of filtration for various plating applications.

13. Clear Lacquers
A booklet describing six clear lacquers for metal and entitled, "Is There a Better Metal Finish Than the One You Now Use?", has been issued by The Egyptian Lacquer Manufacturing Co., P. O. Box 444, Newark, New Jersey.

14. Buffs
A complete line of buffs for every buffing requirement, as well as polishing wheels and compositions, are described in a six-page illustrated folder released by The Udylite Corp., 1651 E. Grand Blvd., Detroit 11, Michigan.

15. Metal Parts Washers
A 28-page book descriptive of metal parts washing machines engineered by G. S. Blakeslee & Co., Chicago 50, Ill., is now available from this firm.

16. Alodizing
A rapid, effective, and economical process for protecting aluminum and anchoring paint is described in a four-page illustrated technical service data sheet released by the American Chemical Paint Co., Ambler, Pennsylvania.

17. Metal Parts Cleaning
An illustrated bulletin describing equipment and detergents for modern metal parts cleaning operations is now being offered by the Optimus Equipment Co., 133 Church St., Matawan, N. J.

18. Infra-Red Ovens and Conveyors
A 20-page catalog published by Jensen Specialties, Inc., 9331 Freeland Ave., Detroit 27, Mich., illustrates and explains the advantages of coordinating infra-red ovens with conveyors in performing baking, drying, preheating and dehydrating operations in a wide variety of fields.

19. Dust Eliminators
A 12-page folder prepared by Schmieg Industries, Inc., 314 Piquette Ave., Detroit 2, Mich., presents illustrated, descriptive, and blueprint data on a complete line of swirl type dust and fume eliminators for industry.

20. Parkerizing
A catalog describing applications and advantages of Parkerizing has been issued by the Parker Rust Proof Co., 2172 E. Milwaukee Ave., Detroit 11, Mich. Coatings obtainable by Parkerizing various products such as forgings, castings, stampings, and so on, are discussed.

21. Degreasers
The Mechanical Process Co., South Orange, N. J., has prepared an eight-page illustrated folder describing its D'Oiler Degreasers for metal which include two and three-dip, vapor spray, barrel, automatic and semi-automatic, and special large degreasers.

22. Fan Systems
A descriptive booklet "Fan Systems for Various Industries" has been issued by the Kirk & Blum Mfg. Co., 2816 Spring Grove Avenue, Cincinnati 25, Ohio.

23. Industrial Infra-Red Lamps
Booklet A-3187 listing applications, types of lamps, and various application data has been issued by the Lamp Division, Westinghouse Electric Corp., Bloomfield, New Jersey.

PRODUCTS FINISHING
431 Main St., Cincinnati 2, Ohio

I am interested in receiving the following literature reviewed in your September issue.

No...... **No.**..... **No.**..... **No.**..... **No.**.....

(Insert numbers denoting literature you want)

Name ..... Title.....
Company .....
Company Address .....
City ..... State.....

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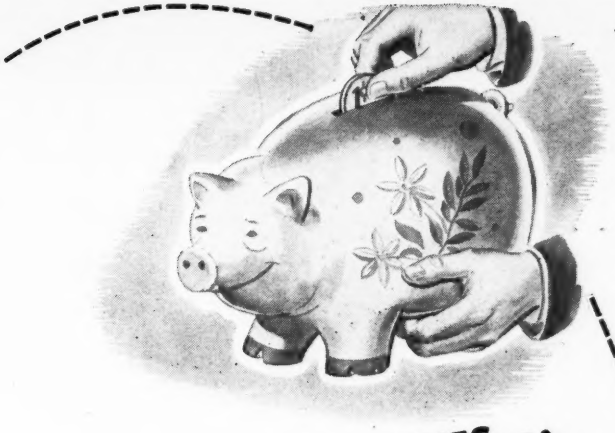
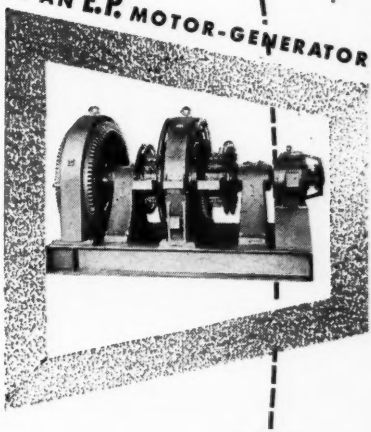


SHOULD WE SAVE PENNIES . . . or Dollars?

USE AN E.P. MOTOR-GENERATOR



•It's not the first cost that counts . . . it's the price of the equipment plus the cost of installation plus the expense of operation and maintenance. Lower life-time cost is the way to save DOLLARS. That's why the E.P. Motor-Generator has been selected to supply hundreds of thousands of direct-current amperes throughout the metal-working industry for electroplating, electrocleaning, electrotinning, electrogalvanizing, electropolishing and anodizing.

Designed specifically for electrolytic processes, the E.P. Motor-Generator reduces power bills because of its life-time efficiency of 75% or better; assures more amperes per dollar because it can safely handle heavy overloads; and requires no special protective equipment like expensive forced-draft ventilating or high-cost vaults.

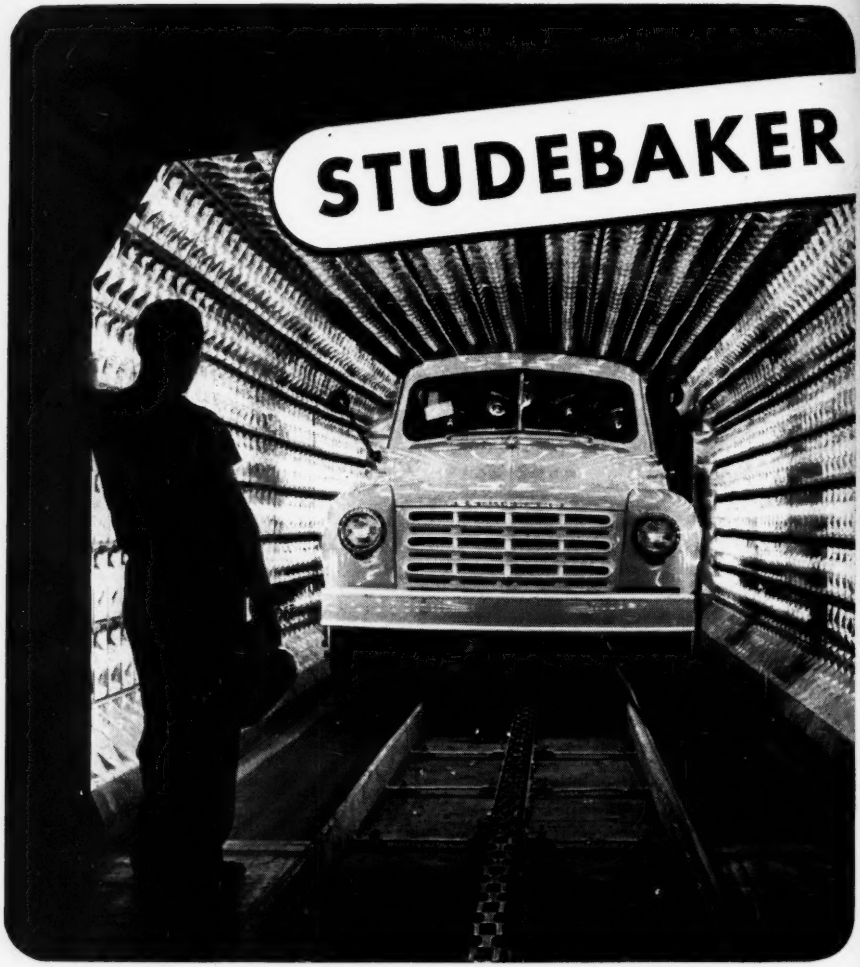
Thirty-four years of operating experience prove that E.P. Motor-Generators give economies of operation unmatched by any other source of direct current.

ASK FOR BULLETIN 202

EP X-40

THE ELECTRIC PRODUCTS COMPANY

1741 CLARKSTONE ROAD CLEVELAND 12, OHIO

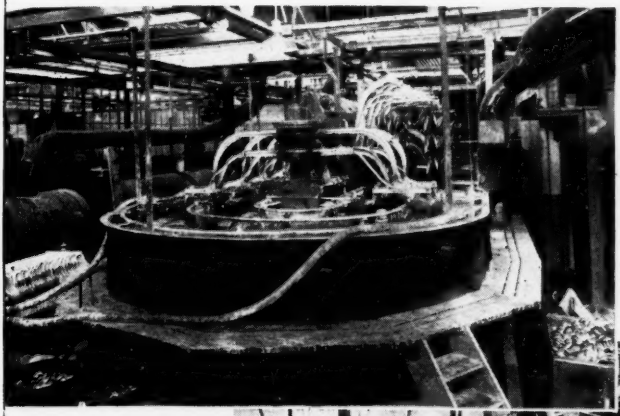


THE FOSTORIA PRESSED STEEL CORP.

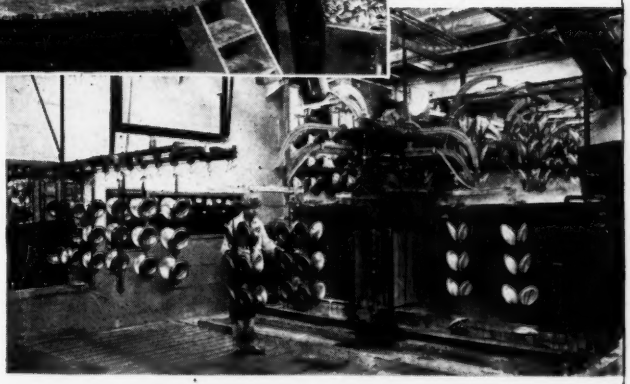
Fostoria, Ohio

Specialists in Infra-Red Heating and Industrial Lighting Equipment

Modern Plating Installation



Return bend plating tank, showing carrier arms in plating position in zinc tank. Arms at rear are at height of transfer position.



Loading end—showing operator easily loading double row carrier arms at working level position.

The Stevens Full Automatic Zinc Plating Machine illustrated above, was installed early this year in one of Ohio's well-known manufacturing plants (name on request), and has materially speeded up their production.

The performance of any type of plating machine in daily production determines whether or not it is properly designed and soundly engineered.

The many nationally known organizations using Stevens Plating and Processing Equipment are mute testimony to its thorough dependability. Stevens equipment is designed for any process and any purpose.

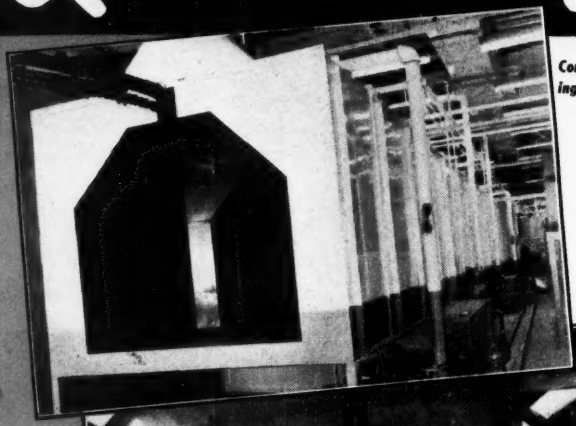
Your inquiry on any type of plating equipment will receive careful consideration and study of individual requirements—at no cost or obligation.

FREDERIC B. **STEVENS** INCORPORATED

DETROIT 16, MICHIGAN

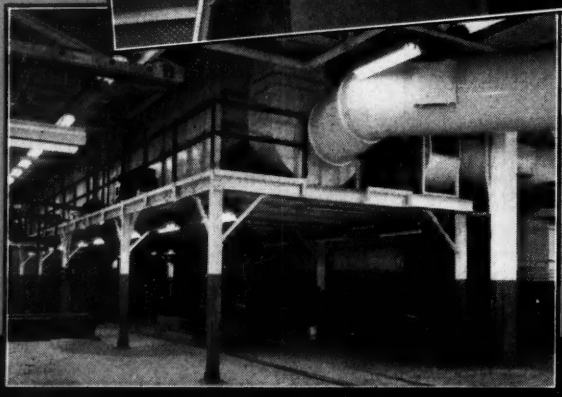
- NEW ENGLAND 166-182 Brewery St., New Haven, Conn.
- NEW YORK and PENNSYLVANIA 93 Stone St., Buffalo, N. Y.
- INDIANA Hoosier Supply Co., 36 Shelby St., Indianapolis, Ind.
- CANADA FREDERIC B. STEVENS OF CANADA, LIMITED
  - 1262 McDougall St. Windsor, Ontario
  - 41 Dover Court Toronto, Ontario

Quality FINISHING EQUIPM



Conveyorized body spray-washing and rust-proofing machine.

Internal view of "Hydro-Whirl" body down-draft prime spray booth. Note: bodies are carried on floor-type conveyor through finish coat process.



Air make-up system for the body booths consisting of pre-heat and re-heat steam coils, air washer and secondary dry filters.

COM FINI SYS

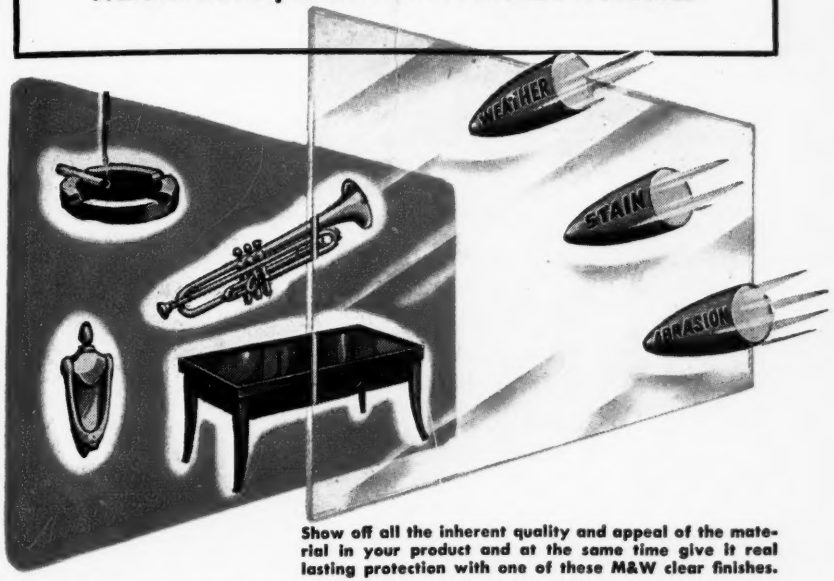
PE

WASHERS SPRAY BOOTHS OVENS

1798

LIKE BULLET-PROOF PLATE GLASS

M&W's Clear Finishes Reveal and Protect the Natural Beauty of Metals . . . Wood . . . Plastics



Show off all the inherent quality and appeal of the material in your product and at the same time give it real lasting protection with one of these M&W clear finishes.

CLEAR SYNTHETICS that can be flasn-baked, slow-baked, air-dried—in fact formulated for practically any finishing schedule—are available for wood, metals or plastics. They enhance the natural surface beauty of a product . . . form a transparent, haze-free film that is flexible, tough, resistant to weather, heat, stains and abrasions. Suitable for spray, dip or brush application.

CLEAR LACQUERS of M&W are well known for their uniform water-whiteness and unusually good adhesion even to metals ordinarily considered difficult to finish. They dry out of dust in a few minutes...harden throughout in one hour. With M&W clear lacquers, polished metals retain natural color and brilliance...take on lasting protection against stains, corrosion, weather, cold, heat—even cigarette burns. Suitable for spray, dip or brush applications.

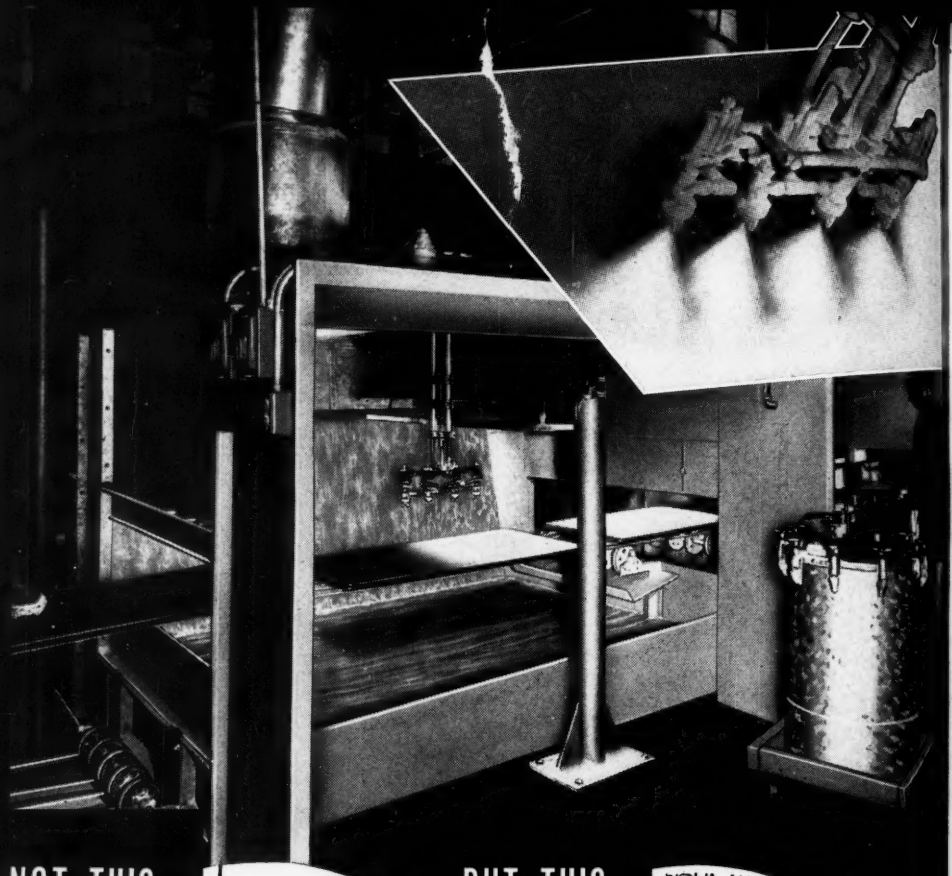
By letting us help you choose the right clear finish for your product, chances are we can save you time, expense and experimentation. Just contact your nearest M&W representative or write directly to any of the offices listed below.

PIONEERS IN PROTECTION
M&W Co. 1876

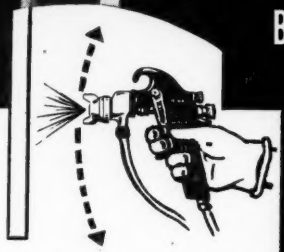
. . . where industry goes with finishing problems

MAAS & WALDSTEIN COMPANY NEWARK 4, NEW JERSEY

Boston 15, Mass. • Chicago 12, Ill. • Los Angeles 34, Calif.
Pacific Coast Division: SMITH-DAVIS CO., 10751 Venice Boulevard, Los Angeles 34
PRODUCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALIZED PRODUCTION FINISHES

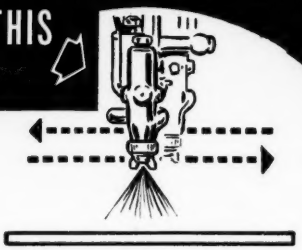


NOT THIS



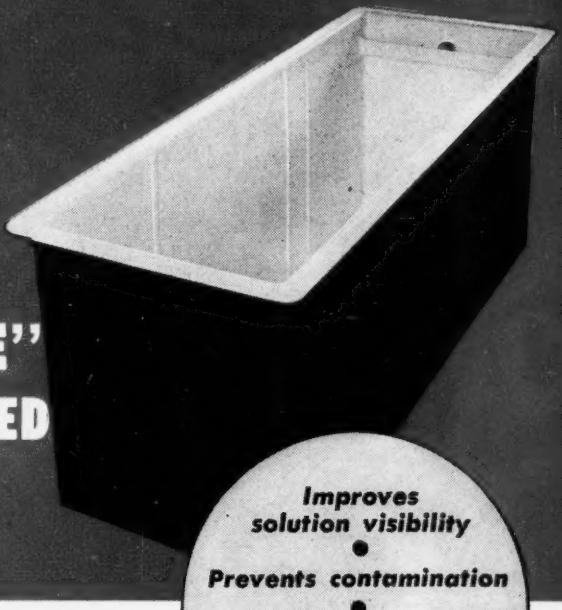
Human muscles and endurance tire and falter—cause "arc" spraying, where the gun is at right angles to the work only at the center of the stroke. Overlapping is imperfect and the finish is applied in a series of thick and thin bands. The trouble increases in direct ratio to the size of the work, regardless of its position.

BUT THIS



Automatically-regulated spray heads move back and forth at uniform speed across and perfectly parallel to the surface of the work. Excessive overlap is eliminated. The finish is applied with perfect uniformity, regardless of size. Because there is no human element of fatigue to consider, a higher production rate of perfectly-finished work at lower unit-cost is the result.

Better
SILVER PLATING
in
"WHITE" TYGON-LINED TANKS



Improves solution visibility
●
Prevents contamination
●
Cuts electrical losses
●
Stops treeing-up on tank walls

There's as much difference between using a "white" Tygon-lined tank and an ordinary tank, in silver-plating, as there is between working in daylight and dark. With a "white" Tygon-lined tank you have real solution visibility, and clear-seeing to the bottom of the tank. You can tell quickly when to filter; you can see any parts that may have dropped to the bottom, which if overlooked could cause contamination.

With Tygon-lined tanks you can be sure of freedom from sulphur contamination; you can be sure of cutting current losses to a minimum; you can be sure of stopping silver treeing-up on tank walls.

Tygon, the chemically inert plastic, is applied in sheets 3/32" thick, by our own special process, to tanks of any size or shape, either at our plant or in the field.

Tygon tank linings will resist any plating solution, have excellent electrical insulating properties, high abrasion resistance, operate perfectly at temperatures up to 175°F., and show no chemical deterioration with age.

● ***Tygon is your best bet for your next plating tank***

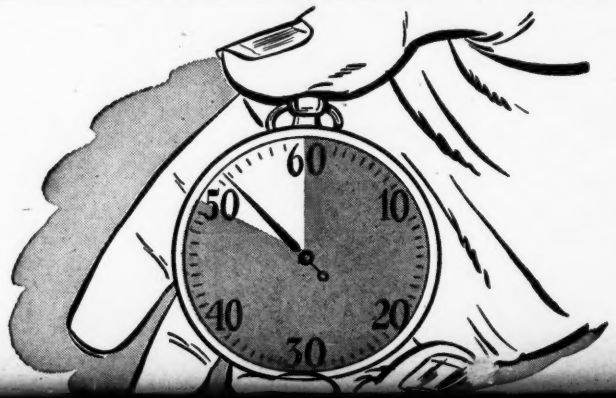
U. S. STONEWARE
Akron 9, Ohio

To remove oil and grease from parts like these . . .

Thoroughly . . . in *one* minute . . . in *one* operation . . . look to Vapor Degreasing! This economical cleaning method removes all traces of grease and oil from parts of any size or shape—of metals, plastics, glass and many other materials. It reaches deep draws, holes and almost inaccessible places—leaves parts clean, warm and dry—ready for the next fabricating or finishing step.

Vapor Degreasing Saves Time, Cuts Cost

In large or small plants, any place in fabrication where quick, thorough removals of oil and grease are required. Vapor Degreasing can speed production, simplify cleaning . . . for accurate inspection during machining operations or assembly . . . or for preparing clean surfaces for subsequent deco-



VA
E
LA

for preparing clean surfaces for subsequent deco-

PAINTS
VARNISHES
ENAMELS
LACQUERS

Engineers
of Fine Finishes
Since 1870

There's a Detrex solvent or cleaning compound for every cleaning application —a *specialized* cleaning agent, scientifically designed for maximum speed and economy. These include:

Both ferrous and non-ferrous metals, and adverse operating conditions, where maximum stability is called for—PERM-A-CLOR, the most highly stabilized of all trichlorethylene solvents.

Average applications — TRIAD, identical to Perm-A-Clor in cleaning power.

Aluminum parts and *painted surfaces.*

Brass, aluminum and *white metal* parts.

Heavy-duty cleaning of *iron and steel* and their alloys.

Cleaning and neutralizing prior to *vitreous enameling.*

Electrolytic cleaning, especially for plating.

Heavy-duty stripping of pigmented oil paints, synthetics, and baked enamels.

Removing all kinds of oils and insoluble dirt, without attack on surface or coating.

[redacted] there are Detrex degreasers, parts washers and dip tanks to most efficiently use these specialized compounds, assuring 100% soil-removal with minimum time and cost. A Detrex field representative can help you on every industrial cleaning application.

Degreasing Machines and Safety Solvents • Metal Parts Washers • Alkali and Emulsion Cleaners and Strippers • Processing Equipment • Spray Booth Compounds